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VOCATIONAL GUIDANCE

INDUSTRIAL TRAINING FOR THE WORKER, NOT THE WORK

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WAS it Bob Burdette who said, "The more I see of folks the better I like dogs?" If so, he might well have added, "The more I see of the American school the better I like my clothes."

When, a generation after the establishment of the public-school system in many of our commonwealths, some keen-minded Yankee tailor thought to turn an honest penny by providing for the New Bedford sailors and wharfmen suits of clothes which they might put on at once rather than forcing them to wait for personal measurement and the tedious processes of hand-sewing, he builded better than he knew. By 1850 when the sewing machine came to the aid of the hand workers, the business had grown from the making of a few ill-fitting garments to an important industry, mostly in supplying the rough clothing of the workers in the South and West.

Not until the introduction of the rotary knife, which made possible the cutting of a dozen or more thicknesses at once, and the coming of Russian-Jewish immigrant labor, with the consequent specialization of processes, about the time of the Centennial, could any comparison be made between the fit and service of "ready-made" garments with those made by the draper or merchant-tailor.

But alert business minds, whose success depended on producing a saleable article, concentrated their effort on this industry. In less than three-quarters of a century they have developed that scientific management which has meant fitting the object to its needs. Thus our clothing industry has passed from the period of individual and mostly home-made products, thru the stage when baggy "slop-chest clothes" of cheap grade were made in few sizes and little variation of type, to the time when a man, be he long or short, fat or thin, can secure his own type of garment.

Clothing the Mind.

We pay half as much for educating our youth in America as for our clothes. And yet in our public schools we dwell in the ante-bellum days. We still furnish ready-made brains, all of the same pattern. Is it any wonder that the "hand-me-down" minds of our children become lop-sided and bag at the knees, when we try to fit them all with the same style of garment?

A child's mind must be unusually deformed before we will give him "custom-made" treatment in a special class. And when we gather a group of these classes of incorrigibles, delinquents, defectives, together into an organized school, we are more than apt to call this an "industrial" school. These classes are for "atypical" children, which means that we have set up a standard average boy who must be able to accomplish certain abstract tasks along certain prescribed lines by a specified age, or our standard machinery breaks down and the child is cast aside as a failure.

Since 85 per cent of those whom we teach in our public schools will earn their livelihood thru industrial processes, may they not be the real type; and if we are to succeed with them, must we not fit the educational garment to the individual child?

It may not be possible to have a tailor-made brain for each child, but it certainly will be possible, and is necessary, to organize a system which shall meet the needs of the great groups of children who tho similar to each other are distinctly different from numerous other groups in our systems. We must fit the hand-minded, the book-minded, the word-minded, with the same skill that our modern clothier fits the tall or the short, the stout or the thin.

Life-Work Training in the School.

While America has always stood for an enlightened democracy, and while education has been the watchword from the time of our forefathers, under the domination of the so-called cultural ideal our schools have lost their hold on our youth at the very time when they most need a guiding hand. Today it is stated that more than six million boys and girls between 14 and 16 years of age are employed in various ways in this country. More than 70 per cent of these child workers never went beyond the seventh grade; less than 60 per cent of them ever reached the sixth grade. How many of them, under present conditions, have been trained for their life work?

In Philadelphia, over 42 per cent of the pupils between 14 and 16 years of age have left school and gone to work. More than 1,700 boys and girls in that city each month secure working papers and are lost sight of by society. A recent study made by the Public Education Association of the child-workers in that community has shown the types of jobs held by these youthful toilers. By this study it was found that more than 37 per cent of the boys and 49 per cent of the girls were employed in factories.

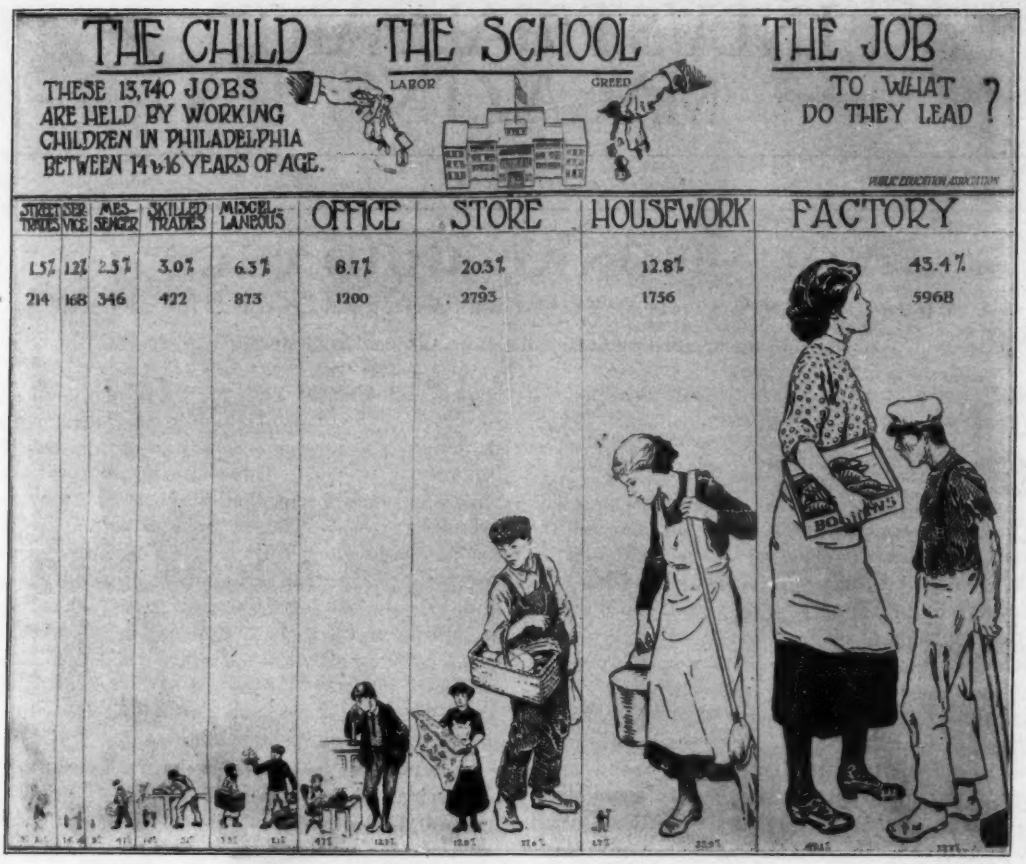


Chart I. Distribution of Child Workers by Industries.

The number and percentage of child-workers between 14 and 16 years of age, in each occupation, is shown in the following table:

Occupations	Number	Per Cent
Store	2,793	20.3
Office	1,200	8.7
Messenger	346	2.5
Factory	5,968	43.4
Street Trades	214	1.5
Skilled Trades	422	3.0
Service	168	1.2
Housework	1,756	12.8
Miscellaneous	873	6.3
Total	13,741	100.0

Chart I shows graphically the distribution of these child-workers by industries. It is notable that only 3 per cent have entered a skilled industry which would give them an opportunity for training for a life career.

The Vanishing Point.

We know that less than 20 per cent of our public-school pupils enter the higher schools. The rest have dropped by the wayside for one of four reasons:

(a) Because the parents failed to see the value of further education of the kind now received.

(b) Because of the natural desire of the adolescent for greater freedom.

(c) Because of real or imagined economic pressure.

(d) Because the break between the grammar and high school in our present system induces many to believe that they have "finished".

The vast majority of those who leave enter low grade industries, untrained, unguided, unguarded, where they average between $4 and $4.50 per week while at work; where they jump from job to job, with consequent loss to the industry and to themselves. By 18 they have reached their maximum wage, and by 30 they begin to go down hill.

This is the reason why vocational training and guidance are absorbing the best efforts of constructive thinkers, both in industry and in education. Already vast commercial enterprises are refusing to accept applicants for positions in their establishments unless they can pass a distinctive test of their ability. Already many firms are spending large sums of money on the proper training of their employes.

The Man or His Work.

If we are to prevent a vast waste of time, energy, and money, two problems must be faced:

First, if we are to test the adaptability of an individual to his work, why wait until he has spent valu-

able time and much money in preparing for a specific job, before applying the test?

Second, why should the test be made only to show whether the individual shall fit the industry? Should we not study as well the fitness of the industry for the worker?

The solution of these problems, the choosing of the job for the man, not the man for the job, the fitting of the youth for and into his life career—this is Vocational Guidance.

This task, so intimately connected with the growth of the individual, and so vital as a goal and outlet for all the training given to the child, is a new function of the commonwealth, if the state is to fulfil its mission to its citizens. It is a task which cannot be done at one stroke, but must be accomplished by such a careful feeling out of the capabilities of the child, "such an unearthing somewhere beneath the irrepressible child surface of that which will point the way to what the child can do and do well in a work-a-day world," as only the school with its constant observation and sympathetic daily contact can perform.

Vocational Guidance is not a new thing, but it must be handled in a new way. The school has always guided vocationally, tho without intent. By abstract tests and examinations it has permitted the chosen few to go thru the portals into professional training. The others, its so-called failures, it has doomed to manual pursuits.

Under present conditions of modern life when industry is divided into a thousand parts, and when the home has lost its grip on or acquaintance with the boy, he is left to stumble and grope for himself. Less than 5 per cent of the males of the nation are fitted by definite educational training for the occupation or vocation they eventually enter.

Before and After the 14th Birthday.

Before he is 14 years of age the law says the boy is a ward of the state, and must attend school. The day after he has passed his 14th birthday, he slips from the hands of the law and becomes an industrial unit, independent—a man—facing the freedom, license and struggle of manhood in a complex, industrial world.

Today we permit our girls immediately after their 14th birthday to go out upon our streets and into our factories to sell to the highest bidder, often a man whom we would not permit to deliver us a bottle of milk unless under the watchful eyes of the law, to sell to this man the most precious possession they have—their lives—in toil; and the Pennsylvania law is today so framed that altho no child is supposed to get his working papers and be released from school unless a definite job is in sight; when the child gets a job and loses it, possibly within

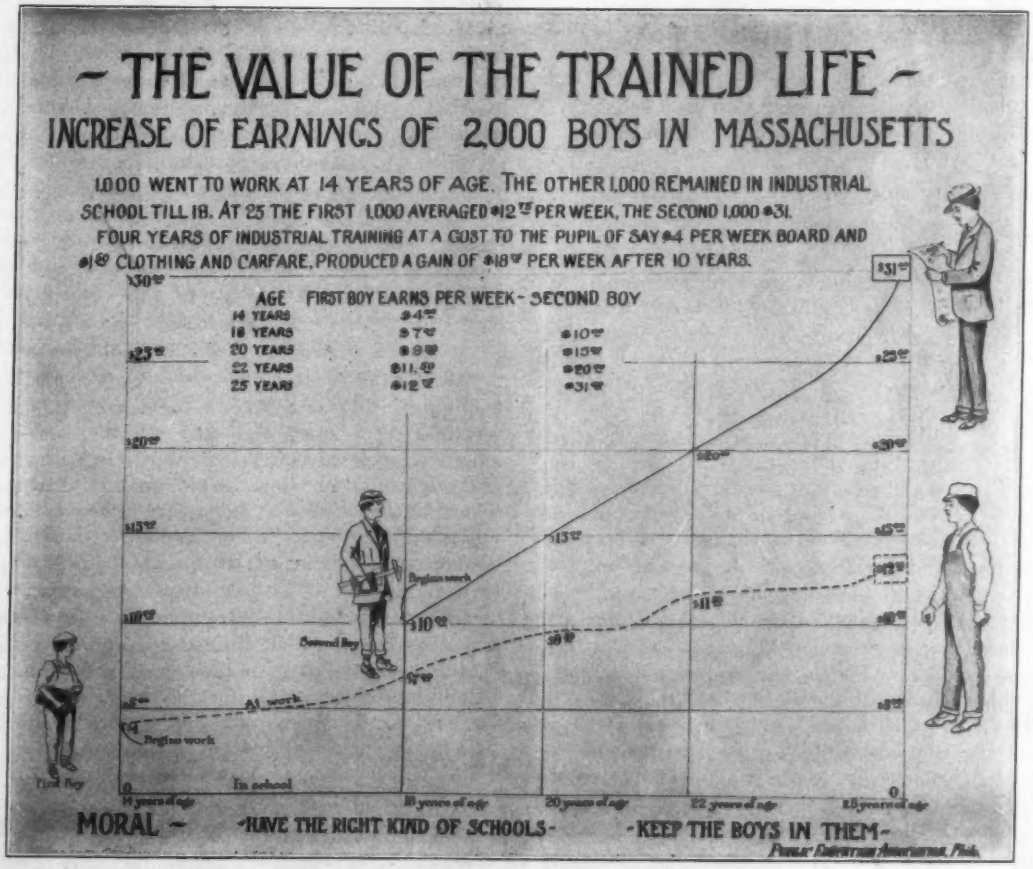

- THE VALUE OF THE TRAINED LIFE -
INCREASE OF EARNINGS OF 2,000 BOYS IN MASSACHUSETTS
1,000 WENT TO WORK AT 14 YEARS OF AGE. THE OTHER 1,000 REMAINED IN INDUSTRIAL SCHOOL TILL 18. AT 25 THE FIRST 1,000 AVERAGED $12 PER WEEK, THE SECOND 1,000 $31.
FOUR YEARS OF INDUSTRIAL TRAINING AT A COST TO THE PUPIL OF SAY $4 PER WEEK BOARD AND $18 CLOTHING AND CARFARE, PRODUCED A GAIN OF $18 PER WEEK AFTER 10 YEARS.
AGE FIRST BOY EARNS PER WEEK - SECOND BOY
14 YEARS $4 $4
18 YEARS $7 $10
20 YEARS $9 $15
22 YEARS $11 $20
25 YEARS $12 $31
$30
$25
$20
$15
$10
$5
$31
$12
$11
$10
$9
$4
At work
Regular work
Second Boy
First Boy
In school
14 years of age
18 years of age
20 years of age
22 years of age
25 years of age
MORAL - HAVE THE RIGHT KIND OF SCHOOLS - KEEP THE BOYS IN THEM -

Chart II. Result of Vocational Education in Massachusetts.

one, two or three weeks' time, he can still retain his working papers and is free to live and loaf upon the streets and alleys, beyond the oversight of the educational authorities.

These youthful floaters are indeed the most evident outcome of our present wasteful methods, both in education and in industry. It is said that in New York there are 70,000 such youths, in Chicago 30,000, in Boston 12,000, and in smaller Milwaukee 6,000. One expert in the study of these conditions has made it a rule of thumb in average industrial cities of 20,000 and up, that one-eightieth of the total population will be found to be these 14 to 16-year-old loafers or untrained workers. This is not merely the problem of child labor. It is not alone the problem of the success or failure of our industries. It is the problem of the conservation of our youth, of the making of the most effective manhood and womanhood of those in our care.

The remedy in its broadest form, the proper social adjustment between the school and the job—such training as will prepare the youth for industrial efficiency for the sake of the producer rather than of the product—is Vocational Guidance. This is vastly different from training the employes of a given industry for a higher standard of efficiency. Beginning with the earliest days of education it aims to serve the man rather than the matter. It aims to produce a more skillful worker and to find for him his most suitable sphere of activity, in the full realization that more and better work must follow.

That such training when undertaken by the state will pay both the worker and the state can well be seen by the results of a recent study in Massachusetts, as shown in Chart II.

Vocational Guidance is Educational Guidance.

In this process of guidance three steps may be suggested as having an important bearing:

(1) The transformation of our present school system, particularly in the seventh and eighth grades, so that a broader experience of real life may be gained by our pupils.

(2) The development of continuation schools, so that the creation of skill in a given industry and the gaining of additional technical knowledge from the school may go hand in hand.

(3) Direct guidance into specific industries of those who have had definite preparation in our school systems.

The purpose of this entire change is to bring our schools into definite relation with life, and to accept the responsibility of the training of all our youth, not merely the 15 per cent who are able to go forward to further academic or professional careers. Last year Philadelphia spent more than a million and a half dollars for the high-school training of 13,039 of its youth. But for the 13,742 of its boys and girls between 14 and 16 years of age, who because they came from poorer homes and harder surroundings needed more distinctly the oversight and care of the state, she spent not one cent, except in the opportunity offered to the few who were able, after a long day's toil, to sit at desks for two hours a night, three nights a week.

Training for Life's Competitions.

Realizing the need of training for community life, for a common understanding, for a common social background, this nation spends each year nearly $420,000,000 on her public schools, in providing the tools of common knowledge. But she is beginning to realize that this ancient idea is outworn. It is outworn only in so far as it is incomplete. It is still necessary, and it will always be necessary, to train our youth so that they may co-operate with each other, so that they may be a part of the great group of citizens. But America is today beginning to face a new responsibility. Not only must she accept the duty of furnishing the elements of co-operation, the simple tools of knowledge; she must furnish her children with the elements of industrial understanding. She must train them for the competitions of life, not merely in such skill of hand, but in such breadth of understanding that they may become better workers, able to stand as self-supporting citizens in an industrial community.

Those who believe in Vocational Guidance plead for the practical training of all the pupils in our schools, not merely so that they may be turned out as skilled workmen ready to place America upon an even basis in competition with German industries, but for the sake of broadening the individual himself. The business men and manufacturers of America do not need to have skilled journeymen turned out of our schools ready for advanced positions, nor is it a function of the state to furnish such complete skill. What is needed rather is an open mind, a development of character, qualities of individual initiative, accuracy, self-reliance, sincerity, responsibility, earnestness, gumption. The problem before us is how to create these characteristics, how to give the boy not instead of, but besides, such basic requirements as reading, writing, a mastery of number relations, and the outlines of geography, such a general understanding of industrial processes, such sense training and efficient control of the hand, as will make the gaining of skill in industry a short and easy process.

The Reorganization of the School System.

While the need of giving the boy a more practical training in life may not be the fundamental reason, it is certainly very closely connected with the cause of the recent wide-spread movement toward the reorganization of our school system from the kindergarten thru the high school. Schoolmen everywhere have come to realize that unless they can secure a more definite knowledge of the development of those under their care than can be gained thru a rating of 60, 70, or 80 per cent in arithmetic, spelling, geography, or any other abstract school subject, they can be of but little service in guiding adolescent boys and girls into their proper life-work or in helping them to prepare for this work. Nor can this be done merely by securing shop-trained men with experience in one or two lines of industry to act as manual training teachers, and to assume the responsibility of guiding our youth in their development.

In reorganizing the school system to meet this evident need, three fundamental facts stand out clearly: (1) That the training of the senses must have a more

definite part—a far larger part—in the work of the schools than ever before. (2) That at some time in the course a definite opportunity must be given for the boys and girls in our care to observe various types of vocations, and to try simple processes of all the fundamental industries, those relating to food, clothing and shelter; so that they may have placed before their minds the opportunities and the requirements of specific lines of industry, with a definite chance under guidance, to choose a general line for their future career. (3) That later in the course definite time must be given for preparation in the fundamentals of this industry.

The first of these requirements can be met in the first six grades of the common school. Here the pupil should secure the wisest and best type of sense training, so that he may learn to hear with his brain as well as with his ears, to see with his mind as well as with his eyes, and to be able to do wisely, accurately and efficiently whatever he finds to do with his hands.

Pre-Vocational Training.

The second step is the crucial one upon which the interest of educators is largely focussed. It is the effort to find something of real value to take the place of the old academic review of the seventh and eighth grades, to meet the adolescent interests and needs at the time when thousands of boys and girls are floating away from the schools, not, as has been supposed, because of economic necessity—not more than 30 per cent of those who leave at this time can be said to do so from the pressure of poverty—but largely because youth seeking freedom and an opportunity to choose his own course, has grown tired of the strict surveillance and formal routine of the school system. Joining with the seventh and eighth grades the ninth, or first year of the high school, many are proposing a new division of the course, called the Junior High School, whose prime purpose it is to give a wide view of life "in connection with the growth in general intelligence and the mastery of the cultural tools, such a knowledge and interest in the occupations of life, and such ideals and skill as will make for efficiency and well-being not only of the individual, but of the community and the state of which he is a part."

The development of suitable courses to meet this plan is a fairly simple matter in such great municipal schools as Number 62 in Greater New York, where there are nearly 3,000 students in the seventh and eighth grades. But since less than 37 per cent of our population live in great urban centers, the problem is really one for the smaller community with one highly developed industry or numerous lesser ones. It is toward this field that our constructive thought must be directed.

It is not the intention in the Junior High School to supplant nor to cripple the fundamental work of the public schools, nor to provide trade training in any sense, but to give such pre-vocational training, such samples of industry, as will make a definite, reasonable choice of a life career not only possible but probable, such a choice as will show the youth the necessity for future training if he expects to climb the ladder to success.

Such a process means a complete transformation of our school system, a complete change of our treatment of adolescence, a new and more definite purpose for the seventh, eighth, and ninth grades. It means bringing the school into contact with life in the truest sense. The teachers must brush away the cobwebs and open their windows toward a work-a-day world, to make a definite attempt to find the needs of industry, the characteristics of definite jobs, and the type of workman that will succeed in them.

Not all of this knowledge need be gained thru practice at the bench or lathe. Much may be learned by observation groups which are organized to take trips thru and make as careful investigations as may be of the various industries in the community. Today thousands of men enter a specific industry or profession without any idea of the characteristics necessary for success in that vocation. They may spend years of their lives in training to be poor lawyers, when they might have been just as honorable and far more content as good blacksmiths or carpenters. Realizing that all knowledge is special, not general, we are coming to feel that the public school must give an opportunity for definite training in his own line of development to each of those who enter its gates if our education is to be thoroly democratic.

Mrs. Helen T. Wooley, of Cincinnati, recently put the case this way: "The early idea of vocational guidance seemed to be that our occupational life included a reasonable number of definite jobs for which there existed an equal number of thoroly fit individuals, but that some of the square-peg individuals had gotten into round-holed occupations and that, if by some mysterious process a new shuffle could take place, and all the square pegs be placed in the square holes, life would be ideal. We have come to realize, however, that when an individual is trained for an occupation into which he cannot fit, he needs not merely a change of occupation; he is really spoiled for the best success in any occupation. Individual cases of adaptability may be found, but the mass of men change but little after a few years in industry."

The kind of Vocational Guidance that the youth needs is that kind which will keep him in school longer, and the kind of Vocational Guidance which the school needs is the kind that will help it carry the boys and girls forward thru the grades further and faster.

Vocational Training.

When, thru pre-vocational training and observation, and thru the expert guidance of the teacher-friend who has learned to feel out his capabilities, the boy has chosen a general line of occupation for his life career, he should enter a period of vocational training, which may cover the last three years of his high-school course. With at least 15 per cent of the pupils in the high school this vocational training will be preparation for the professions or for a higher academic or technical career. Courses must also be offered which will continue the general education. But it seems incontrovertible that, for a majority of the students in the public schools, the training must be so shaped that it will prepare for com-

mercial life, for agriculture, for household arts, or for the industries.

This vocational training, which should be given only by those who have had both the practical experience and the special preparation necessary to teach it properly, will give our boys and girls that equipment which is necessary for successful bread-winning. This training, which will be general in its nature, will provide skill in those operations which are more or less common to the typical industries of the community. If possible this training should be given in co-operation with a specific industry. The state cannot afford to develop men who are all feet or all hands or all ears or all tongues. But it must be responsible for efficient citizens, for well-rounded men.

The transformation of the school system, with the added function of guidance thru training of both successful and unsuccessful workmen, may be graphically shown in Chart III.

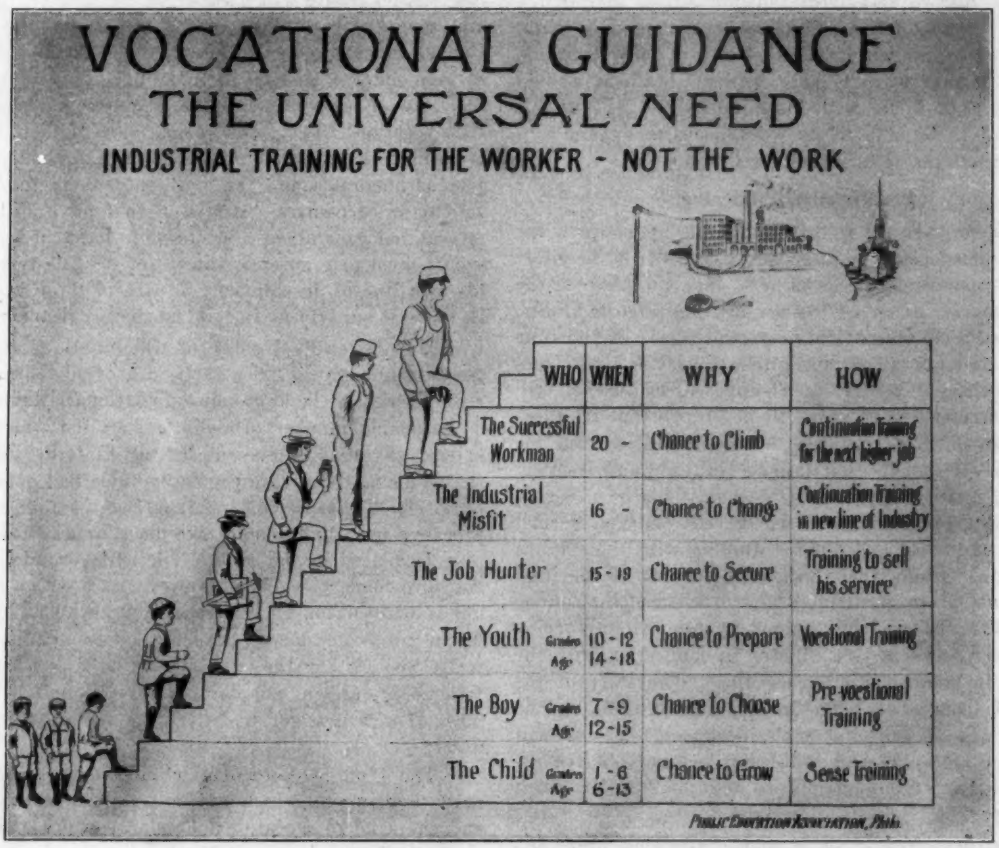


Chart III. Effect of Vocational Guidance.

Specific Guidance.

For the job hunter, be he 14, 18, or 21, the school which has taught him, and which has helped him choose his life career, will assist in the responsibility of securing the best position from which to make the start in life. The school will be in sufficiently close touch with industry to know the employers who will give the best opportunity for a square deal, and will see that the pupil has learned how to sell his services to the best advantage. Then, after the job has been secured, the school either thru its own agents, or thru co-operation with accredited volunteer organizations, will follow the pupil into the home and into the shop, to assist him in taking advantage of every opportunity for advancement in skill and in position.

A Guide to Promotion.

Under this new plan the school will not rest satisfied, however, with training and guiding its pupils for man's estate. At least two other classes will claim its attention and demand expert direction and care.

First, the unsuccessful worker who today is discouraged; a misfit. For him society must offer a means of training in some line of industry in which his efforts may have a better chance of success. This continuation training must be closely allied with that type of guidance which will choose the position for the worker and not rest satisfied with testing the worker to see whether he be fit for the work.

The last class is that of the successful workman who sees the next step ahead of him, but has no means of knowing what it would require, either in manipulative skill or in technical knowledge to reach that step.

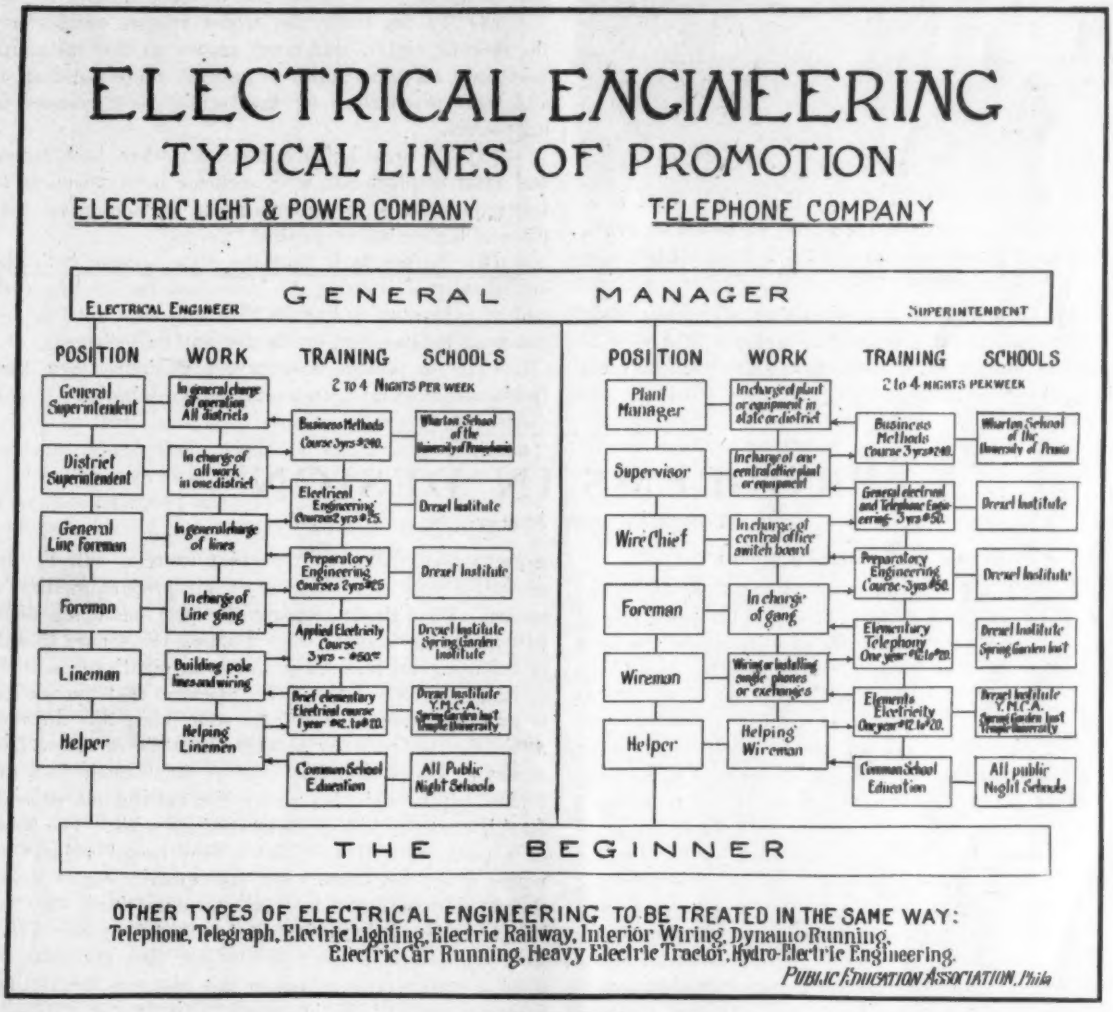
Nor does he know where such knowledge or skill may be secured.

The results of an effort to find for two types of workmen the kind of information which may be of direct service to them, are shown in Charts IV and V. In order to secure these facts and to place them in useable form, four steps were needed. (1) A series of conferences was held with a variety of officials and workmen, and a direct study of the operations in Lighting and Power Companies and in Telephone Operating was made, in order to find out the line of promotion, since no one official in either industry could give the facts desired. (2) A study was made of the type of operation required in each position. (3) A careful comparison of the requirements in technical knowledge, in skill of hand, or in control of men, needed for success in each type of position was made. (4) The schools offering the necessary types of courses were studied, to ascertain the class periods, time required for completing the course, preparation necessary, and cost.

This material was filed in detail, so that thru office consultation an employe can gain the information needed in regard to his future course. The main facts, however, were organized for quick reference.

Perhaps in no industry could all the lines of possible growth be ascertained or charted. Probably no two men climb to success over exactly the same path in any one industry. But in all, the typical steps in promotion may be discovered and placed at the service of the ambitious man. Such a detailed study of industry will also uncover the complete lack of training in our American schools for many types of occupations.

When the state accepts her full responsibility, she will make such a definite study of her typical industries as to chart out the steps of advancement, and to show exactly what is required of the young workman in the climb to industrial independence. Then she will help him meet these requirements thru her public schools, thru an investment in trained citizenship. And she will make this study from the standpoint of the worker, for the worth of the individual, for his truest development. When these steps in progress are clearly defined this


ELECTRICAL ENGINEERING
TYPICAL LINES OF PROMOTION
ELECTRIC LIGHT & POWER COMPANY
TELEPHONE COMPANY
GENERAL MANAGER
ELECTRICAL ENGINEER
SUPERINTENDENT
POSITION
WORK
TRAINING
SCHOOLS
2 to 4 NIGHTS PER WEEK
General Superintendent
In general charge of operation All districts
Business Methods Course 3yrs $240.
Wharton School of the University of Pennsylvania
District Superintendent
In charge of all work in one district
Electrical Engineering Courses 2 yrs $25.
Drexel Institute
General Line Foreman
In general charge of lines
Preparatory Engineering Courses 2yrs $25
Drexel Institute
Foreman
In charge of Line gang
Applied Electricity Course 3 yrs - $50
Drexel Institute Spring Garden Institute
Lineman
Building pole lines and wiring
Brief elementary Electrical course 1 year $2. to $10.
Drexel Institute Y.M.C.A. Spring Garden Inst. Temple University
Helper
Helping Linemen
Common School Education
All Public Night Schools
Plant Manager
In charge of plant or equipment in state or district
Business Methods Course 3 yrs $240.
Wharton School of the University of Penna
Supervisor
In charge of one central office plant or equipment
General electrical and Telephone Engineering 3 yrs $50.
Drexel Institute
Wire Chief
In charge of central office switch board
Preparatory Engineering Course 3yrs $50.
Drexel Institute
Foreman
In charge of gang
Elementary Telephony One year $2 to $20.
Drexel Institute Spring Garden Inst
Wireman
Wiring or installing single phones or exchanges
Elements Electricity One year $2 to $20.
Drexel Institute Y.M.C.A. Spring Garden Inst Temple University
Helper
Helping Wireman
Common School Education
All public Night Schools
THE BEGINNER
OTHER TYPES OF ELECTRICAL ENGINEERING TO BE TREATED IN THE SAME WAY:
Telephone, Telegraph, Electric Lighting, Electric Railway, Interior Wiring, Dynamo Running, Electric Car Running, Heavy Electric Tractor, Hydro-Electric Engineering.
PUBLIC EDUCATION ASSOCIATION, Phila

Charts IV and V.

knowledge must be so organized and so presented to the worker that he may know exactly what is before him, and just where and when and how and at what cost, in evening or continuation school, in co-operative class work or correspondence study, he may find an open gateway to the knowledge and training required.

Such a course of training, such an organization of our public schools, with the new social viewpoint and the new definite contact with life, will bring increased returns to the commonwealth. It will pay the state, it will pay the industry, it will pay the workman in increased contentment, in satisfaction, in skill. It will produce the trained democracy for which we are all striving.

Summary.

We have tried, then, to say that if the state is to secure adequate return for the money expended on public education, if our schools are to meet the vital needs of today, it will be necessary:

(1) To reorganize the schools on a business basis, to give them the same type of thought, with a view to fitting the product to its needs, as is today put into great industrial enterprises.

(2) To recognize the fact that the vast majority of industrial workers never enter the high school, but leave the grades at 13 or 14 years of age and receive no further educational care.

(3) To realize that if Vocational Training and Guidance are to show us the way out, they must be adapted to the social view-point, they must focus upon the relation of the child to his future life work for the sake of the producer rather than of the product.

(4) To transform the school system, particularly the seventh, eighth, and ninth grades, so that the youth may have an opportunity to gain an understanding of and some preparation for the vocation best adapted to his powers.

(5) To furnish the industrial worker, both before and after employment, with accurate information as to the requirements for entrance and promotion in that place of higher learning called "the job".

(6) To see to it that the state accepts both the opportunity of training the individual for his life work and of extending to him its directing care until he becomes an independent productive unit in society.

(7) To provide this expert guidance thru that fundamental social agency—the public school.

PROBLEMS IN DESIGN

Bonnie E. Snow, Millburn, N. J.

Lesson III—Surface Rhythms.

IN the two lessons preceding this, one of the simplest manifestations of the principles of rhythm was developed by means of the form of decoration known as borders. If we keep in mind the broad definition of rhythm as given in Lesson I—that it is related movement—we shall find that borders are only one of the many rhythmic manifestations about us. The universality of these manifestations brings to us a realization of the importance of some understanding of rhythm as a basic art principle. Lesson III, herewith presented, deals with the next step in the development of such an understanding —a rhythmic repetition of a unit over a surface—and gives some of the ways of attaining good results in the working out of several problems. As a beginning, we use again the device of paper-cutting—a device that is reasonably sure to bring us good results, and that will prepare us for a more intelligent use of intellectual effort later on, when we have attained a clearer idea of what rhythm really means. Our first exercise will be the repetition over a surface of a unit prepared within a square. Fig 1 shows a square of paper, measuring about two inches on a side. Fig. 2 shows the square folded, and a marginal line drawn about an eighth of an inch, or less, from the edges. (It is essential that the margin is narrow, because, as will be seen later, this distance establishes the pathway between the units in the surface repeat.) Fig. 3 shows half of the unit sketched on the folded paper, and also shows the cutting-out process. In this case, the scissors do most of the work. The point of a penknife will be found a very useful adjunct in places where the scissors are inadequate. Fig. 4 shows the cutting completed and the paper unfolded. We see here a cluster of shapes arranged within a square. From the very nature of their production, they are balanced upon a vertical axis, which in this case was the vertical diameter upon which the square of paper was originally folded. The shapes present interesting areas of large, small and medium sizes, thus attaining variety. There

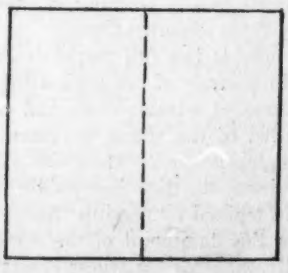


Fig. 1.

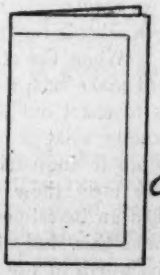


Fig. 2.

Fig 3.

Fig. 4.

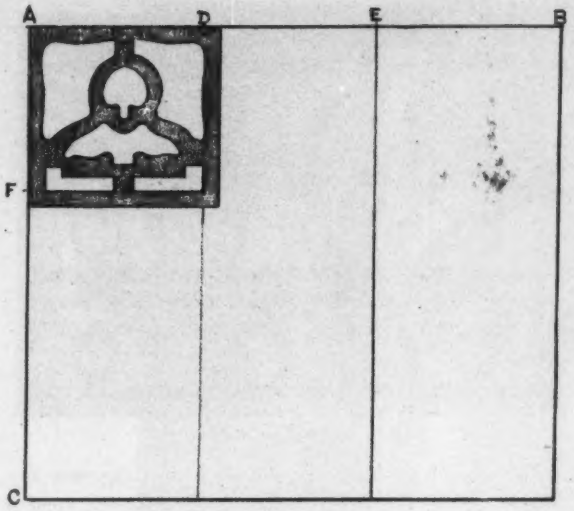


Figure 5.

is a sufficient similarity or relation in the shapes to establish a sort of family likeness, which we may call unity. The pathway between the shapes is sufficiently narrow, so that the shapes hang together; if the pathway were wider, there would be too great separation.

Having secured by this process, and thru this reasoning, a satisfactory unit, we dip the stencil in melted paraffine, allowing the wax to penetrate the fibre of the paper. (An end of a common wax candle may be melted and used for this purpose.) When the paraffine has cooled, the stencil is ready for use.

Let us plan to repeat our stencil unit a certain number of times within a rectangular enclosure. Fig. 5 shows the process. The necessary conditions for this are the establishment of vertical and horizontal lines, as AB and AC. The stencil is fitted into the corner and is held in place by the left hand, while the tracing around the openings is made with a well sharpened lead pencil. Before removing the stencil, place point D (Fig. 5) directly above the inner edge of the right margin. From point D drop a vertical line. The mission of this guide line in locating the repeat is the same as that of the line AC. Because it coincides with the inner edge of the margins it insures the required width of the pathways in the repeated pattern. Point F is located in the same manner and for the same reason. The repeated pattern is shown in outline in Fig. 6. In Fig. 7 the unit was first traced on paper of a warm gray tint in light value, and the shapes then filled in with a darker wash. The pattern, as it now stands, is in one sense a finished result. In another sense, it is the mere beginning of experimentation, for the designer is always looking toward the possibilities or suggestions offered by a unit or a pattern. He considers the design at this stage as an arrangement of shapes and areas with which his imagination may play. He looks for interesting background shapes, and for such manipulation of the unit as will increase the interest and enrich and enhance the beauty of the whole arrangement. With this in mind, one result of such experimentation is shown in Fig. 8. Here, the two large wing-like shapes of adjoining units have been united at the base, thus establishing a new unit, and emphasizing certain background areas that did not appear prominent before. In this arrangement further interest and beauty were attained by changing the values of certain shapes, as shown in Fig. 9. By comparing this last result with Figs. 6, 7, and 8, we see that the mind has been at work, and has added interest and beauty to the beginning in increasing ratio.

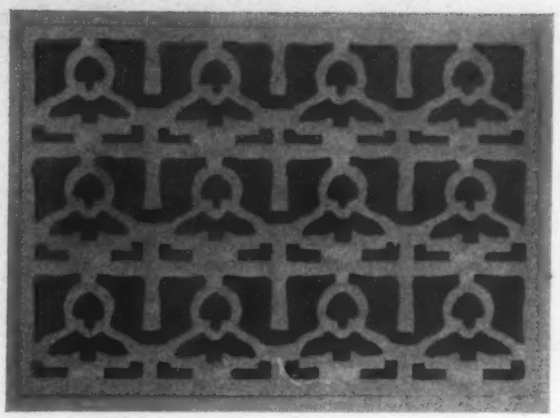


Figure 7.

Fig. 10 shows another variation of this same arrangement of the unit, attained by a reversal in the use

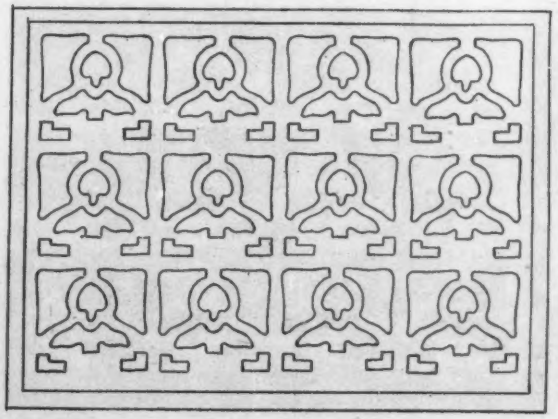


Figure 6.

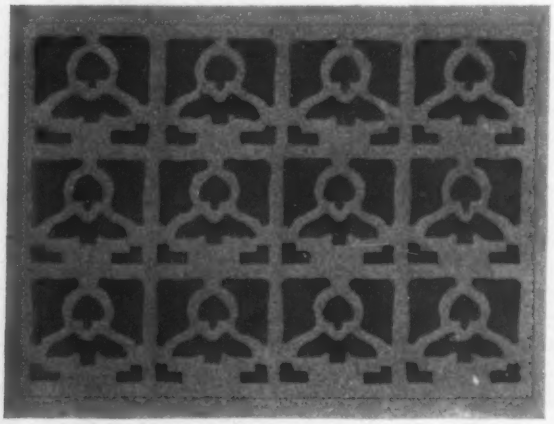


Figure 8.

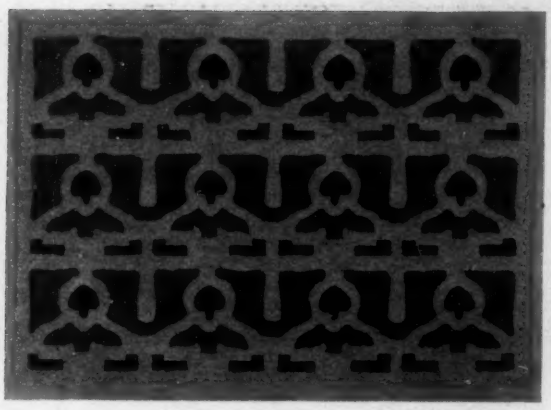


Figure 9.

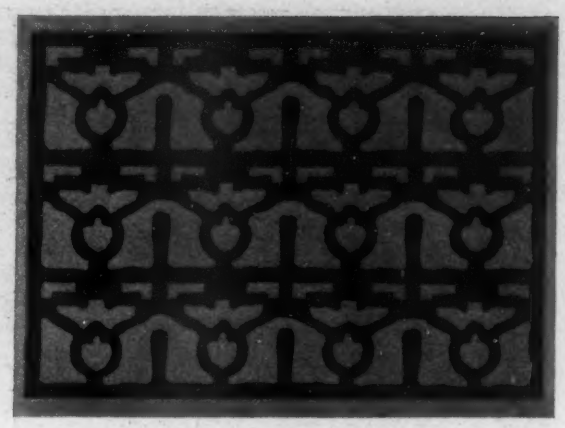


Figure 10.

of values. In Fig. 8 the different shapes were washed in with a darker tone; in Fig. 10, the pathways are toned and the shapes left light. There is no change in the *drawing* of the unit in these two arrangements.

The planning of a design to fit a certain material is quite a problem in itself, and will be considered later; but sometimes experiments such as those just illustrated are in themselves suggestive as to materials with which designs might be worked out. Fig. 10 seems to indicate its appropriateness for an ornamental iron grating.

Fig. 11 shows a practical use made of the unit in stencilling a design for curtains.

Sometimes these "all-over" patterns are found beautifully embroidered in rich color schemes. In the different museums in our country may be found fine collections of these embroideries, done by nations in the past, and to a certain extent in the present time. Fig. 12 shows a bag, made from a piece of Bulgarian embroidery, where the unit of design was based upon a square. The color scheme was a charming combination of rose-pink and gray-green, on a gray-orange background.

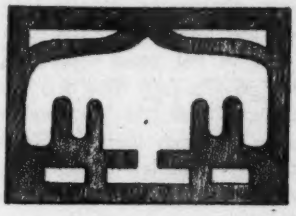


Fig. 13.

Fig. 14

Problem VI.

Cut from paper approximately two inches square a unit resembling Fig. 13 or Fig. 14. Prepare the stencil by dipping it in melted paraffine. Trace a surface repeat on a tinted paper of a light grayed tone. Wash in the shapes with a darker tone of the same color.

Problem VII.

Plan to repeat your stencil unit on a piece of pongee or linen, that would be suitable for a work-bag. Use oil color, diluted with turpentine. Dip the stencil brush into the diluted color and then wipe the brush quite dry, using a rag for this purpose, in the same way that you would wipe a pen.

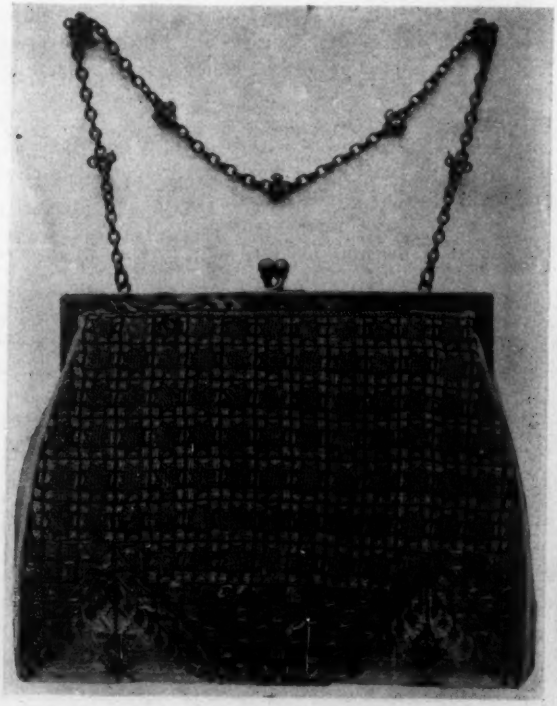


Figure 12.

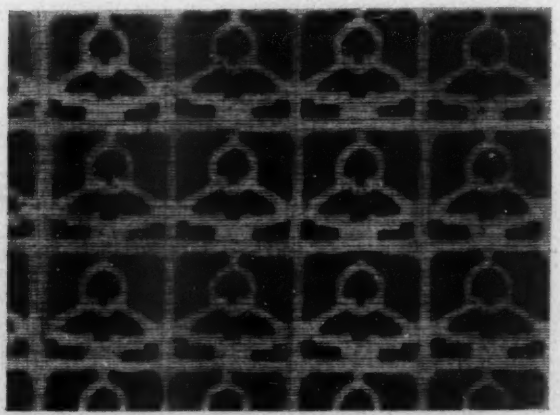


Figure 11.

Ninth Grade Class Puddling Cement and Building the Frame of Grandstand.

Practical Arts at Bellows Falls, Vermont

Edward E. Parlin

MANUAL TRAINING is not a new department at Bellows Falls, but the phase that it has taken this year is a decided departure from the old.

The problem we face here is to equip the boy to face squarely the general needs of the community as a citizen, for whatever walk of life he leaves the school to enter. It is not to train skilled mechanics, as some think, but to give them a sympathetic understanding of the productive and distributive activities that surround them. There are no results, I think of, finished this year that have not stood the test of utility and beauty under the boy's eye. No article is made until a discussion has been undertaken as to whether or not the same is needed to promote a better understanding of real school life. The work is done, as nearly as possible, in relation to outside up-to-date activities, which adds double the value to it as a real live project.

The room in which Manual Training had been taught was leased for other school purposes, necessitating the selection and equipping of another room. Two rooms only were available, one in the attic and the other in the basement. The latter was chosen because of its fine light and easy access. It had formerly been used by the High-School students for various indoor athletic games. One may imagine the color of the walls and ceiling that had once been whitewashed. It took but a short time for several of the grade classes to figure the square surface, and find the amount of Alabastine, in pounds, required to cover the walls. The color was chosen by the boys, which was light green for the walls, with a white ceiling and light brown window casings. It was a fine sight to see the boys working at a room that was to be their shop and their place of education in Practical Arts.

A large piece of slate was found in the basement and the superintendent told the boys that it was their black-board. After discussion, it was decided to place it on the north wall, as the light came from the south and west. The frame was made, the brick wall plugged, and the board placed in position.

The tools were lying about the shop and to the boys it was evident that a cabinet was needed. A convenient location was chosen. The cabinet was made of cypress matched boards for the exterior, and a pine interior. It was finished in shellac and varnish, and presents a pleasing appearance as well as one of utility.

As things moved along on the wheels that were becoming well oiled, the big project was presented. Mr. Collins, Superintendent of Schools, who is an enthusiast for practical school problems, suggested that the department build a grand-stand on the Public Playground, which lacked one. He proposed to have the plans drawn by the high-school mechanical drawing class and presented to the board of trustees of the town for approval. The plans were presented and accepted by the board.

During the meeting of the board of trustees, it was suggested that it would be a good plan to have some of the trees that were plentiful on the playground cut and used. The suggestion was carried out. In one week the trees, which were felled by a laborer, were back at the playground, and in two more weeks, constructed into a grand-stand. By using these trees, the cost of the

Mr. Parlin is a graduate of the Fitchburg Normal School and is passing on and enriching its message of service.—*The Editors.*

Boys "Filling" Chairs, Making Sleds and Working on Tool Cabinet.

Boys Placing Blackboard and Refinishing Walls and Ceiling.

structure was reduced to a minimum and the total cost to the town was $35.

Before the classes went to the grounds to work, a model of the grand-stand was built in the shop with several different constructions shown on it, and the best one was chosen for the construction of the stand.

The stand was constructed of two-inch stock thruout. The uprights are supported by concrete piers, mixed five parts of sand, three of trap rock, and one of cement. Two barrels of cement were used and these were puddled by the boys. One hundred fifty pounds of ten and twenty penny nails were required in the construction of the stand. The stand is 34 feet long, and so constructed that it may be added to at any time. It has a flight of steps in the middle, and consists of seven tiers of seats, each tier one foot higher than the next lower. The structure was completed in two weeks' time by 125 boys of the seventh, eighth and ninth grades.

Many valuable lessons were gained by the different classes in the making of joints, use of the square, framing and the construction. During the whole time, the boys went at the job with a vigor that expressed the interest, manifested by them, in their work. The next Monday morning found one of the classes back at the school shop ready for work, with keener interest than ever before.

We found that we could purchase quartered oak chairs, of pleasing design, set up in the white, for $15 per dozen, or about one hundred per cent less than we could obtain them for at a retail store all finished. Three dozen were ordered and arrived in good shape. The first valuable lesson was the sanding, after which came the mixing of a paste filler. It was mixed by the boys and a color, golden oak, was chosen to harmonize with the interior wood finish of the different buildings. After the coat of paste filler came shellacing, which was rubbed in oil. Following this, each chair was given a coat of varnish rubbed in oil to get that fine soft dull finish. All the time that this work was going on, other projects were being carried out. All boys were busily engaged in some part of the work.

In the Sewing Department, a curtain was made to be used with the new stereopticon lantern. The glossy or oil side was turned to the wall and fastened to a wooden hanger. A coat of white paste filler followed, which was allowed to dry before the two coats of aluminum paint were applied. It made an excellent curtain and brought out clearly the details of the pictures. The cost to the school was about one-fourth of the commercial cost. In addition to a curtain being made, it helped make boys, which is the great aim of Manual Training.

With their knowledge of filling and finishing chairs fresh in their minds, desk tops were attempted, and so well did they succeed in scraping, planing, and applying shellac and varnish, that now one room has planned to have the best looking set of desks in the grades.

As pictures were needed, proofs were purchased and now it is common talk among the boys as to what pictures they framed. One boy picked out "The Mill" by Van Ruysdael and framed it, toning the frame to harmonize with the Sepia print. The picture is hardly one a teacher would pick as the choice of any particular boy. The interest grew and pictures of all shapes, sizes, and description found their way to the manual-training shop. The moulding was purchased in the white. The boy was not asked to rabbit it out, as they do it by machinery in the mill. However, we have the mitre joint, the art, the beauty of fine harmony and the finished product. When one looks over the favorite pictures, he can but wonder where ideas of choosing pictures came from. The pictures framed here were for the schools. Then the boys purchased moulding for their own use and framed pictures after school. The favorite pictures were as follows: "Leaving the Hill" by Farquharson, "Sir Galihad" by Watts, and an "Avenue of Trees" by Hobbena. Many other pictures were in the group, but these proved to be the favorites. The list was made out by the Supervisor of Drawing, Miss Mary E. Baker, who is a contributor to art magazines.

Other projects which have been carried out are as follows: lumber rack, typewriting tables, map repairs, shelves, drawing boards, work horses, placing benches in shop, window ventilators, hangers for steam pipes, vises, spool racks for sewing department, bulletin boards, assembling toys, sleds, money drawer for Commercial Department, and work benches.

In Saxtons River, Vermont, a part of the school system here, five miles from this town, Practical Arts are

Boys at Saxtons River Making Stringers for Fire Escapes.

taught, and much valuable work has been accomplished. The first period is an hour and the seventh and eighth grades combined have the last period of one hour and a half.

At the rear of the school building a fire escape hung six feet from the ground, which was far too high for the boys and girls to jump, so it was thought best to build on. The classes were taken out and, after discussing the plans, thought it would be well to change it for safety, experience, and appearance. In the picture the Ninth Grade can be seen busily engaged in making stair stringers.

At this school, the equipment is not as large as the equipment at Bellows Falls, but the same interest prevails and a vigorous spirit is shown toward all work. Among the pupils are thirty boys from the "Warner Home" of the "Kurn Hattin Homes". These boys made a 150-foot watering trough for their barns during two class periods. Among the many projects accomplished are repairing of curtains, making of ventilators, camp stools, benches, jumping standards, setting fourteen panes of glass and some painting.

A fence is to be erected by the boys of Saxtons River, to replace one that was blown down, and we feel sure that it will be a good piece of work.

In Bellows Falls, the boys are allowed the use of the shop nights, and some of the repairs made on their sleds, athletic apparatus, and other things from outside, only lead me to believe that Practical Arts are here to stay.

The plans for the spring are numerous and we feel assured that they will be carried out with the same spirit as has been shown in all other practical projects. Each lesson presents new and pleasing projects and we are glad to feel that fads have no longer a place in the school curriculum, that doing the real things that place the boy in touch with the activities of the outside world has come to stay, and to educate the boy along beneficial lines, for himself and the community at large.

Suggestions for Architectural Drawing in High Schools

E. J. Lake, Art Department, University of Illinois

(Third Article)

Elevations.

IT is necessary to draw each of the four elevations of a house at scale to show the finish, position, and sizes of exterior walls, roofs, porches, windows, doors and chimneys. These elevations should be labeled according to the cardinal directions.

If the house faces south, the four elevations would be labeled the South Front; East Side; West Side; and Rear North. It is well to begin with the Front elevation as it is the most important in appearance.

Before the elevation is drawn a section of one wall should be drawn on the left of the paper and at scale, as shown at A in Figure 12. This drawing establishes heights for the elevations according to the construction used in the house. If the ordinary ballon construction is to be used, the height of the walls is governed by the length of studding used, the construction of the sill at the bottom, and the plate at the top of the studding.

In the section shown, eighteen-foot studding are used with a box sill and a double plate at the top. The box sill is a common construction in the Middle West. A single two-inch plank (called a wall plate) is laid on

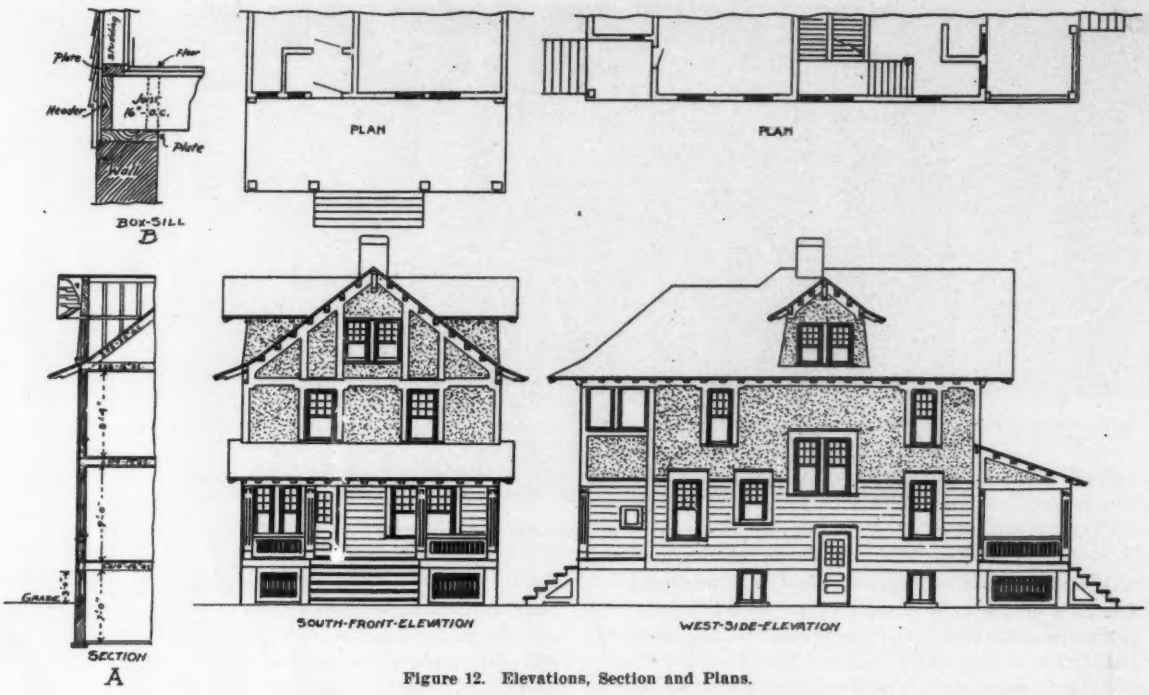


Figure 12. Elevations, Section and Plans.

the basement wall. It is illustrated at B, Figure 12. The first floor joists rest on this wall plate, sixteen inches from center to center. A two-inch plank (called a header) is spiked to the end of the joists. A second plate (the width of the studding) rests on the joists, and the studding rest endwise on this plate. On the top ends of the studding, which are sawed to uniform length, rest two plates, and on these rest the ceiling joists, (2″x8″) sixteen inches from center to center.

The studding may be sixteen feet instead of eighteen for a small house, but of course this makes the ceilings correspondingly lower. In some cases short studding are used for each story with plates between stories on which the second-floor joists rest.

Since stock sizes in rough lumber are cut to lengths and widths, divisible by two, it is important to utilize the stock sizes without cutting. A mill book should be at hand for the selection of stock sizes in lumber, doors, windows, etc., and the pupil should learn stock sizes and forms. The second-floor joists (in the section shown) are 2″x10″ and rest on a board 1″x6″, which is housed into and nailed to the studding. This board is called a ribbon by builders.

All plates, joists and studding are spiked together. The basement wall (of the section shown) is built into the ground four feet, and out of the ground three feet. If built of brick, a one-brick wall in thickness is sufficient for the basement wall of small houses. If built of rough stone a 10″, 12″ or 14″ wall in thickness is best because a thin wall in rough stone requires much trimming of the stone, and is therefore expensive.

There are various treatments for the cornice. In the drawing shown an open or railroad cornice is represented, with the rafters exposed below and ceiled over to the wall. This is a cheap and picturesque cornice for small houses and bungalows.

Cellar windows may well be hinged above to the frame and swing in. First-floor window sills are commonly placed from eighteen to twenty-eight inches above the floor except where they may be placed higher to accommodate a table underneath as in the kitchen.

Second-floor window sills are often placed higher above the floor than those of the first floor to give more seclusion in the second-floor rooms. It is well to plan window sizes and heights to make the doors and windows head over at the same height in important rooms. This gives a much better appearance in a room than to have the heights of openings vary. The sizes may be noted on the section of the wall placed on the left of the front elevation, and they may vary with purpose and conditions, but this section should be drawn at scale and of desired sizes first so that heights may be projected with the T square to the elevations.

By placing the plans of the basement, first and second floor, attic, and roof successively above the space on which the elevation is to be drawn (as suggested in Figure 12) the widths of the elevation may be projected with the triangle on the T square. Another convenient way to get the widths for the elevation from the plan to the elevation is to use a strip of paper, marking the sizes on the strip and transferring them to the elevation. Each of the elevations can be projected from the front elevation, and the plans as shown in Figure 12, but having drawn the front and one side elevation the rear and other side elevations may be traced in reverse from the front and side elevations thru tracing paper. The opposite elevations differ only in details which can be easily adjusted and one can be traced from the other much

quicker than they can be projected. This is customary office practice.

After the general contours of the elevations are secured, the appearance should be considered critically. If the house looks box-like and uninteresting, a studied use of belt courses, panels, grouped windows, bay windows, easement in the roof-lines, dormers may add much to the interest and appearance, but may also add to the cost. Avoid monotonous repetitions of equal intervals. Watch the general contours to see that they are pleasing.

Do not attempt to avoid irregularities in openings but candidly express the interior on the exterior. There is a charm in the exterior expression of the interior parts of a house, as an exposed chimney enlarged for the fireplace, or a series of windows showing the rise of a stair. Every architectural design should express its use on the exterior.

Ornaments should be used sparingly and should be in keeping with the material. Wooden ornaments should appear as beams, posts, panels, brackets, dentils, and mouldings. Carved wood is of doubtful use. Fret-sawed boards and spindles are consistent to wood, but should never be cut small or fine. Usually they appear too delicate for the exterior. The exterior of a house should appear substantial and therefore plain, but of studied proportion and contour. One great handicap in American home design is the tendency to use transported material. Our transportation facilities have made wooden houses cheaper than local brick, or stone even in sections where wood is not common. This is of course fortunate in that it has made it possible for individuals to own their houses; but the time is not distant, if it is not already at hand, when local materials as brick, stone, tile, and concrete will not only make our houses more substantial, but will also make them reflect local conditions by the use of local materials.

Imported rusticity is not a solution of the problem of house design. Such affectations as Spanish tile roofs in a cold climate, log houses or houses built of rough field stone are too often extravagant and inappropriate in design as well as in cost. House design, like all design, is a study of conditions and purpose with consideration of beauty.

Perspectives.

It is impossible to get the full effect of a house from the elevations. Houses are rarely if ever seen in elevation and, therefore, cannot be consistently designed in elevation only. Mechanical perspective is not beyond the high-school pupil, but requires some time to learn and to execute. When it is possible to make a drawing in perspective the effect upon the design will be beneficial, for the perspective shows the house in a view in which it is commonly seen.

The skillful architect makes small perspective sketches of a proposed house in different designs to study the effect. Figure 13 illustrates such a sketch. Notice how the shadows are suggested in pencil lines, and how they pronounce the overhang of projections. They are not drawn mechanically accurate, but are made deep or shallow to suggest the projection above. The ability to do such simple and suggestive sketching is a considerable asset to the architectural draughtsman, and may well be practiced in architectural drawing in the high school. With school pupils the perspective should, of course, be made after the elevations have been drawn in pencil.

A socalled 45° perspective is easiest to understand and execute. The first step in the process is to place the first-floor plan with the walls at 45° with a horizontal line MN and the front corner touching this line as shown at A in Figure 14. The plan should be tacked to the board in this position. From the front corner A draw a vertical line A-S of a length (at the same scale as the plan) representing the distance from the house at which the house is to be observed. S represents the point of observation from which the perspective is drawn. It is well to have this distance at least three times the height of the house and more for flat-roofed houses. In Figure 14 this point S is 120 feet or nearly four times the height of the house from the point A. From S lines S-P and S-Q are drawn parallel to the sides of the house and intersecting the horizontal line M-N at P and at Q. Between the plan and the point S a sheet of paper is tacked, as illustrated, on which to draw the perspective. Across this sheet of paper is drawn a second horizontal line X-Y, at a height on the paper suitable for the horizon in the perspective. This line represents the eye level in the view to be drawn. To the right, or left, of this sheet, tack the front elevation of the house, drawn at the same scale as the plan above. This elevation should be so placed that the horizon, X-Y, crosses the elevation at the eye level of an observer of the house. The higher the horizon (eye level) is placed on the house the more of the roof and ground will be shown. The lower the horizon is placed the more the house will appear to be elevated. In the Perspective sketch (Figure 13) the horizon is taken along the bottom of the basement. It is assumed in Figure 14 that the house is graded up from the street three feet, and that the basement wall is three feet above grade level. In this case the top of the basement wall is the place for the horizon as it would appear to a six-foot person at the observation point S. Draw verticals thru P and Q intersecting X-Y at V-L and V-R.

We are now ready to draw the perspective on the sheet of paper tacked below the plan by projecting points from the plan and from the elevation. Any point in the

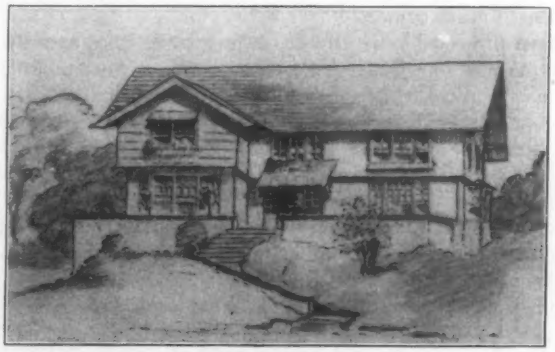


Fig. 13. Perspective Sketch in Pencil.

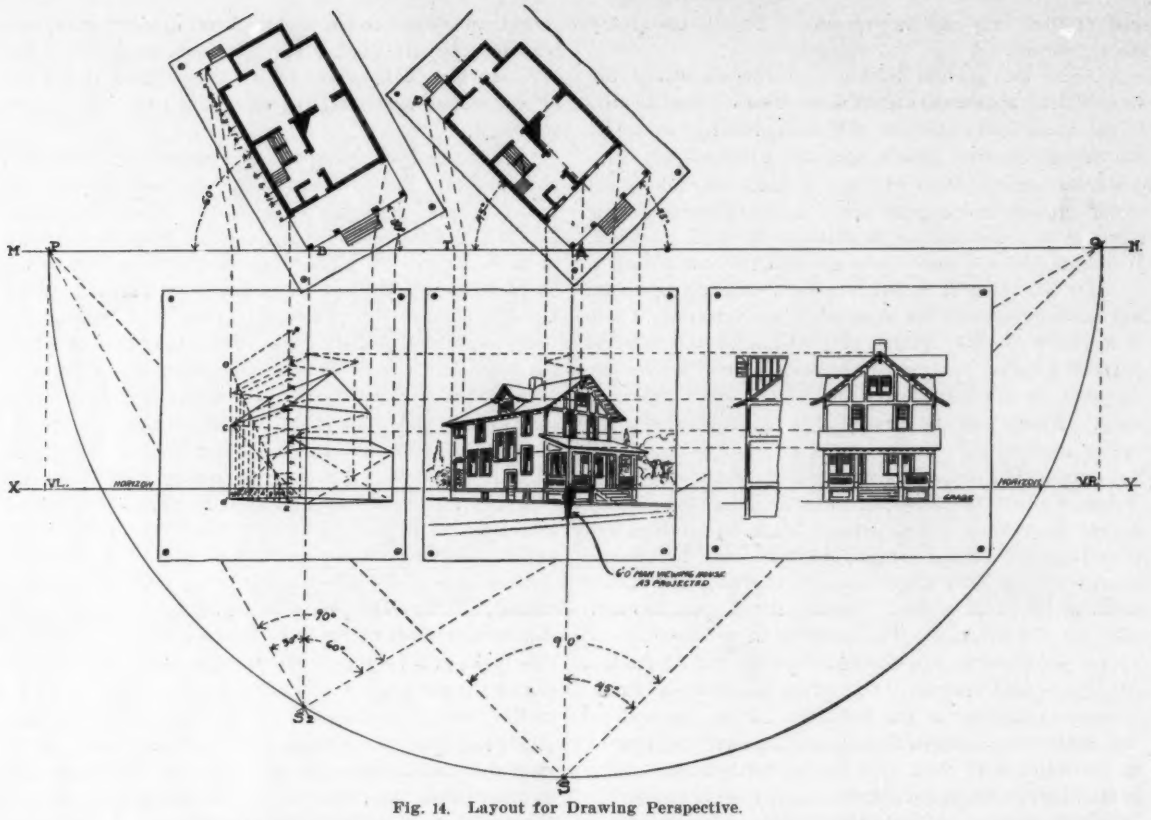


Fig. 14. Layout for Drawing Perspective.

perspective can be located by the intersection of two lines thru the point. Any point on the plan may be projected toward S to intersect on P-Q and then projected vertically downward to the perspective. The corresponding point on the elevation may be projected horizontally to A-S, and then projected toward V-L or V-R to intersect with the projection from the plan. The corner of the porch will be on a vertical line from point A on the plan. This corner will appear of the height projected horizontally from the elevation to the vertical A-S. This front corner *is the only line of the perspective* that will be drawn in the size of the elevation.

All lines running to the left from this front corner in the perspective will converge toward V-L. All lines running to the right from this front corner will converge toward V-R. All points projected from the plan must first be projected toward S to intersect on P-Q, and then projected vertically downward to intersect with the same point projected from the elevation. All points on the elevation must be projected horizontally to A-S, and then projected toward V-L or V-R to intersect the same point projected from the plan. Two points establish a line. Having found any point in the perspective, horizontal lines running thru the point will run toward V-L or V-R. The width of walls, openings, etc., are found on the perspective by projecting from points in the plan toward S to intersect on M-N. Then these widths are projected vertically downward from these intersections to cut off the lengths on the perspective drawing below.

For example; the rear left corner of the house is projected from point O on the plan towards S to T on the horizontal line M-N. It is then projected vertically to cut off the rear corner of the left wall of the house on the perspective drawing.

To secure the ridge of the roof its height is first projected to AS. Then it is projected to the near corner of the main part of the house by projection toward VL. Then toward VR to intersect with a vertical from the plan. It is evident that any point may be located by the intersection of two lines thru the point, and any line can be drawn thru two points located on the line. VL or VR is one point on all horizontal lines in the house and but one other point is necessary. In this manner any point may be located and any line drawn in the perspective by projections from the plans and elevations.

The several plans and elevations should be placed consecutively in the position of the plan and elevation shown in Figure 14, and the necessary points and lines projected from them, as described above, to develop the perspective.

Forty-five-degree perspective does not, however, show all houses to advantage. It is desirable at times to show one side of a house more nearly in front view than another. This may be done as shown on the left side of Figure 14. In this case the plan is placed so that the front corner touches MN at B, and the sides of the house are 60° and 30° with MN. $B\text{-}S_2$ is projected vertically downward from B. S_2 is 104 feet from B at the same scale as the plan above. From S_2 a line is drawn at 30° with $B\text{-}S_2$, locating P at its intersection

with MN. From S_2 a line is drawn at 60° with B-S_2 locating Q at its intersection with MN.

Projections are made from points in the plan at B, toward S_2, intersecting on MN and are projected vertically downward to intersect horizontals from the corresponding points on the elevation, as in the 45° perspective.

It is evident that the plan can be placed at any angle with MN and the horizon can be placed at any height on the house, but the station point must be on a vertical thru the point of contact between the plan and MN and the lines drawn from the station point must be parallel with the sides of the plan so placed.

After the block form of a house is secured in perspective, as shown at C, Figure 14, the details may be put in by a very simple method. It will be seen that any subdivisions on the vertical side of a rectangle drawn in perspective, as a, b, c, d, may be projected to the point of convergence (vanishing point) of the receding top and bottom of the rectangle until they intersect the diagonal of the rectangle and then projected by verticals to subdivide the perspective length in the same proportion.

This enables one to subdivide the side of a house into any proportions, as e, f, g, h, i, j, k, l, taken on a strip of paper from the plan and laid off on the near vertical corner of the house. This method is much quicker than projecting points from the plan for each detail, and should be used to get such subdivisions as windows, doors, etc. Of course, the diagonal a-m must be drawn from the same corner (a in this case) from which the divisions start. The other diagonal d-p would give the proportions in reverse order.

It may also be noted that equal subdivisions of any rectangle in perspective may be secured in perspective by the intersection of the diagonals, just as they are secured in a rectangle not in perspective.

Note—Any questions on perspective submitted to the author will be answered thru the "Question Department" of the INDUSTRIAL-ARTS MAGAZINE.

THE DEPARTMENT OF INDUSTRIAL EDUCATION, STATE NORMAL SCHOOL, OSHKOSH, WIS.

Hans Schmidt, Director of Industrial Education

In the Fall of 1912, the Board of Regents of Normal Schools of Wisconsin, following out their policy of establishing departments for the training of teachers in special phases of school work in the various normal schools, created the Department of Industrial Education at the normal school at Oshkosh, Wis.

The purpose of the courses offered is the preparation of teachers for the public schools of Wisconsin in manual, industrial and vocational training, for continuation schools, supervisors, specialists, etc. The entrance requirements are those which a high-school graduate possesses and in general these graduates make up the mass of the students at the institution. Others who do not intend to teach but desire to profit by the technical courses offered are also admitted, as well as people of mature years, intelligent mechanics and artisans who desire to specialize along some one line of work or who are fitting themselves for the teaching profession ultimately.

The courses offered are of two and three years' duration, both leading to a diploma. The three-year course is similar to the two-year course, but specializes in some branch of technical or scientific knowledge.

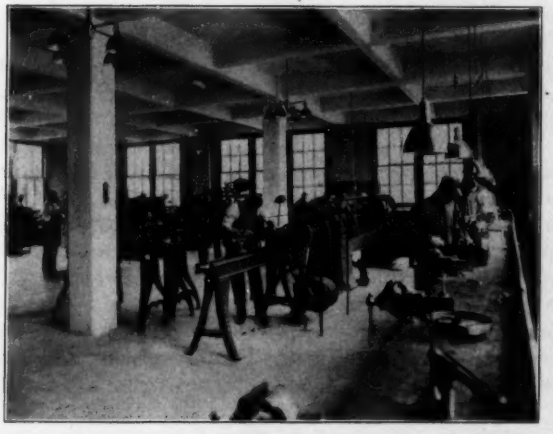
The building devoted exclusively to the needs of the department is a three-story concrete-and-brick construction, fireproof building, with a one-story extension containing the forge shop and the foundry. The building, with its equipment, represents an outlay in excess of $100,000. The school furnishes its own light and power by means of a 50 K. W. generator and a 100 H. P. engine. A special feature of the building is the complete and extensive lighting system. Aside from the general lighting distribution of the various shops, each machine has its own lighting stub with flexible armored conduit, which permits the light to be placed in any position and where needed. All of the lamps are tungsten lamps and provided with high efficiency reflectors. The foundry is served by a flaming arc lamp besides the individual lighting of the molding benches. The total illumination approaches 20,000 candlepower.

The machine equipment is especially worthy of note. All of the machines are of the best of their type and all are individual motor driven, the absence of all overhead belting being a feature, thus permitting a free passage of light, doing away with overhead dirt and grime and eliminating the inefficient and dangerous overhead works. The individual motor drive makes for great economy of operation as no more power is generated than is actually used at the various machines while at work.

The machine shop is 53′x54′, lighted on three sides. Adjacent to it is a large tool room fitted up with shelves and spaces for all tools. The check system of giving out tools is in vogue in all of the shops. The equipment of the machine shop is at present as follows, to be added to materially in the near future: One 20″ patent head quick change gear engine lathe, two 15″ quick change gear lathes, three 16″ patent head lathes, one 12″ lathe with the O'Brien electric drive, this lathe having plain gears and is used for speed lathe work and for the demonstration of gear changes for screw cutting, one 24″x24″x6′ planer, one milling machine, one universal cutter and drill grinder, one 23″ sliding head drilling machine, one 16″ sensitive drill, wet tool grinder, center grinders, vises, etc. The stock of small tools is very complete.

The forge shop is 30′x53′ and absolutely fireproof. The equipment includes: Sixteen down draft forges, part with automatic foot lever blast gate control and

Industrial Education Building, State Normal School, Oshkosh, Wis.



Machine Shop.

Class in Applied Design.

Pattern Shop.

Art-Craft Room.

part with hand-lever control, two smoke-consuming hand blower forges, one shear and punch, one drill press, one motor-driven double grinder, a complete set of small tools, swadges, etc. The shop is absolutely free from all smoke and fumes and the exhaust is served by a 70″ exhauster, while the blast is produced by a 16″ blower.

The foundry is 30′x53′, well lighted and has ample means for ventilation. The molding floor proper is 20′x28′. The equipment and operation follow very closely commercial practice. The equipment is as follaws: One 20″ sectional cupola with a commodious charging platform, one blower, one 30″ brass furnace, one cabinet core oven, one motor-driven double grinder. The cupola and floor are served by a duplex hoist and trolley. Aside from the molding floor, accommodations for twelve students at the benches are provided. There is an ample supply of flasks, both wood and steel, riddles, molders' tools, etc. The cupola is worthy of mention and is built so that it may be taken apart in a few minutes, and the influence of various charges of coke, flux and iron shown to a class. By putting several students at work on the different sections, the cupola may be daubed and prepared for a charge in less than an hour.

The woodworking machineshop, which is also used as the pattern shop, is 53′x54′. Adjacent to it is a fireproof stock and drying room 20′x22′. At present the equipment includes: One 24″ cabinet surfacer, one universal saw, one 12″ jointer, one ball bearing shaper, one 36″ American band saw, ten motor head wood lathes, one 14″x6′ motor head pattern makers' lathe, one post disc sander, a tool grinder, wood trimmer, mortiser, electric glue heaters, etc. The benches are of the cabinet type with 5′ top and rapid acting vises.

The bench shop is on the second floor, above the pattern shop, and the two are connected by an electric elevator. Besides 20 Cabinet benches with 6′ tops and a variety of rapid acting vises, the shop contains: One 30″ band saw, one semi-universal saw table, one 8″ hand jointer, one 36″x6″ motor-driven grindstone. The small tools are all of the best. Opening off of the bench room is a varnishing and finishing room, 18′x22′ containing a commodious fireproof store room for varnish, oils, etc. Connected to this room is a drying room 14′x18′. There is also provided a room for finished products, 18′x24′.

The room devoted to the craft work is on the second floor. It is equipped with heavy vise benches and heavy tables for book binding, carving, leather work, etc. The benches are fitted with anvils, stakes, sockets, etc., for copper and jewelry work. The usual tables for soldering, annealing and heat treatment are provided as well.

The work in applied design and freehand drawing is carried on in a large and well lighted room on the third floor. This room is equipped with drawing tables, built by students, model stands, cupboards, etc.

The general policy of the department has been to make as much as can profitably be done, for the school and nearly all of the equipment, aside from the machinery has been built by the students. This phase of the work has been very interesting and profitable as well, both for the students and for the school. By putting to their own use those things which they themselves have made, induces a critical attitude on the part of the students and permits them to judge of the correctness of design and proper construction in the light of actual use and wear and tear. Errors and poor construction "come home to roost" in this manner, which has a very salutary effect on the students as well as on future work.

PAYING BOYS FOR THEIR WORK.

Eugene C. Graham, Supervisor of Industrial Arts, Evansville, Ind.

The work of boys in school shops should be paid for at a reasonable rate. If it is right to charge boys for material used in the construction of furniture it is only fair that they should be allowed to repay it in labor which may be worth more to the department than a payment in money.

In the Evansville, Ind., High School we have been keeping an account of the material used by the boys in the classes in woodworking and we offer the boys a uniform rate of five cents per period in return for their work. No money is paid to them but whenever we have work for the school which they can do, they are given an opportunity to work out the cost of the material used by them in work for this department or for other departments of the school. For instance, boys have made about 40 new drawing boards, nineteen drawing tables, a bench for the sheet metal shop and have done a large number of odd jobs such as cleaning and repairing machines, piling lumber, painting benches and putting leather tips on lunchroom stools in payment for material furnished them. They show an entirely different attitude toward this work than they did before this system was put in and the labor cost of the work done in five months would have been about four hundred dollars if men had been hired to do it. Boys are still allowed to pay their lumber bill in money. Many of them still prefer to do this, but last term 75 boys worked out lumber bills amounting to $50.00 in all by working ten to fifteen school periods each for the school. The record is kept in the class book and boys are credited with time just as they are charged with material and in the same book. Near the end of the term the accounts are checked and boys whose bills still remain unpaid are notified. There has not been a sign of unwillingness to work and the only problem which has required any thought has been that of finding the right work at the right time.

It will not do to ask boys to work on "jobs" for private individuals or for teachers and a good many such offers have been turned down but in a large school system a great deal of work may be done which may fairly be charged against material.

In the wood turning we ask the boys to turn all the handles needed for chisels and vises and they keep us supplied with mallets. In return no charge is made for the material used by them in making articles for home use. No account has been kept of the material turned over to them but the work done is entered in the account kept by the teacher. At the close of the year we expect to present to the school board a record of work done which will more than equal the cost of all the material provided for the department.

Pictures and their stories mounted in the Picture Books by pupils of Joliet, Ill

PICTURE STUDIES IN THE GRADES

M. F. Gleason, Supervisor of Drawing and Construction, Joliet, Ill.

PICTURE study in the grades, for various reasons, is one of the most difficult subjects in the entire curriculum to approach and handle with a degree of satisfaction, which seems commensurate with the energy and time expended. The influence of this kind of work, however, is altogether too valuable to lose without making some desperate effort to put the matter in such a form as will make things easier and more definite for children and teachers.

To begin with, it is very essential that each child have a copy of the picture to be studied for his own. He must have it in his hands; he must have time to form his own ideas at close range. He must be able to carry the picture, and the enthusiasm aroused by the study of it, into his home, thereby spreading the good.

Making it possible for each child to have a copy of the picture is not always an easy task. It is true that magazines sometimes print enough small reproductions of desirable pictures to supply an entire room, but they are very apt to be of inferior quality. Good reproductions may be procured for little money, but it is very difficult to find any merchant who will handle them because the selling price per picture is so very small. This fact alone forces the handling of them onto the teacher who would carry on this kind of work.

It is not to be greatly wondered at when we stop to consider, that many of us have been a long time coming to profitable picture study. All experimentation takes time and patience.

Experimenting in Joliet has led to what we are finding a satisfactory method of handling the proposition under consideration.

At the beginning of the year when the children are bringing in their textbooks they are asked for enough money to buy the pictures needed for the year. It seems a little bit easier to get money for this purpose at that time than at any other period of the year. This money is collected from all the schools and sent to the office of the board of education and the purchase of pictures is carried on from that place. Because we buy in the neighborhood of forty thousand we are able to get the pictures for about eight dollars per thousand and supply them to the children at the rate of ten for eight cents. This surely is a very reasonable price. We do not consider the cost of express or cartage because that is taken care of in the same way as the general supplies are handled.

Like every city of similar size, we find among our number some who are not able to pay even the small amount asked for. These are taken care of to a great extent by a local organization called "The Public School Art Society," the purpose of which is to spread as much art as possible thru the city schools. In no case is a child left without pictures because he is poor.

In order to make the work as light as possible for the teachers, and to secure some definite information bearing on the different pictures to be put into the hands of the children and the teachers, a committee of ten is appointed from each grade to gather data to be used in the grades from which the committee has been appointed.

In selecting data, an effort is made to give points which will help the child remember the picture and the artist, more emphasis being placed upon the artist and his life in the upper grades than in the lower. The story side of the picture is the phase of this work that appeals principally to the young child and it gives him a first-rate chance to increase his vocabulary and express himself freely.

In order that the children may comprehend clearly and have something based on the picture, which they are able to handle, the information collected by the teachers is in every case adapted to the ability of the grade for which it is intended.

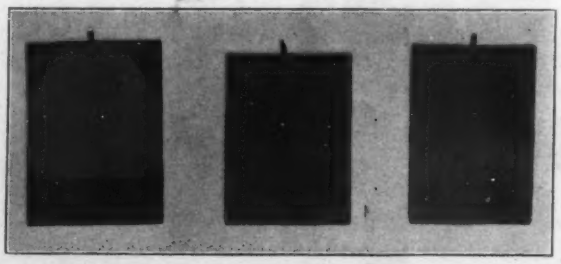
The print shop of the Manual Training Department runs off enough copies of the story of each picture so that each child in the city may have those which relate to the pictures he is studying. This gives a practical problem to the print shop and helps to make that place one of great value to the school system.

The printing is done on paper similar in size and tone to the size and tone of the picture. By doing this we are able to avoid striking contrasts when the printed slip and picture are mounted side by side.

Formerly all the pictures to be used during the year were sent out at one time, and before the end of the year came, the child had made himself familiar in his own way with his entire set. This plan after a few weeks, left no new pleasures for him to discover and enjoy. Now the pictures and printed slips are sent out to the different schools at the beginning of each month.

One of the features of our picture study which has counted for most, is the book which each child makes, in which to mount his pictures and printed slips. This gives him some orderly and safe way of preserving his pictures.

These books vary according to the grades in which they are used. In the first grade the book is a one-section affair made of paper only. In the second and third grades stiff covers are used and the book is trimmed after the child has completed his work. In the fourth grade the children begin to miter the corners and turn over the cover paper to hide the edges of the cloth board which forms the stiff covers of the book. From the sixth grade up the books are sewed in sections, and corners of vellum are added for decoration.



First, Second and Seventh Grades Picture Books made by Pupils in Joliet, Ill.

Before mounting, the white paper which is usually found surrounding the pictures is trimmed down to a narrow edge, just enough being left to add to the attractiveness of the reproductions. First-grade children are unable to do this accurately, so in many of our schools the children of the upper grades are asked to do it for them. This does not take away any from the value which the children of the first grade might get out of the general picture study and adds a little to the spirit of helpfulness which should be developed in our children.

In the lower grades most of the work bearing directly on the picture is done thru conversation lessons. In these talks the following points are developed—how the picture got its name; what the principal characters are doing; location of scene; time of day; time of year; incidental stories suggested by the picture.

From the second grade up children express in writing what they have gathered from the study. We do not mount any of this kind of work in what we call our Art Books because it seems to detract from the general artistic appearance of the books.

The following hints are taken from a bulletin sent out to teachers preceding the beginning of the work on picture study:

First—Let the children find out what is in the picture. Under this point I think it would be a good thing in upper grades to begin by naming the most important things first, working down to minor details of background, etc.

Second—Make them see why the different objects are in the picture. In the lower grades children will be apt to decide that things are in the picture because of the story that the different parts must help to tell. In the upper grades children should be led to consider the presence of objects in the picture from other standpoints. In some cases they are brought in for the sake of composition, in some for the sake of color harmonies and in others to emphasize in some way or other the historical setting of pictures.

Third—Let children and teacher tell a story which is suggested by the picture. In seeking for suggested story, try always to impress on the minds of the children the story which the artist wished to convey to our minds when he painted the picture.

Lead the children to see that most of the great artists specialized along some one line. Corot excelled in landscape painting; Millet gave his attention to the working peasants; Murillo worked on religious subjects; Reynolds spent much of his time producing likenesses of the faces of royalty, etc.

Do not neglect anecdotes relative to either the picture or the artist. Many times these are the things that

fix the picture in our minds and give us an interest in the work which develops into appreciation.

The course in picture study in our schools embraces the following pictures:

GRADE I.

Sept.	Squirrels	Landseer
Oct.	Brittany Sheep	Bonheur
Nov.	The Balloon	Dupre
Dec.	Madonna of the Chair	Raphael
Jan.	Baby Stuart	Van Dyck
Feb.	Can't You Talk	Holmes
Mar.	Feeding the Birds	Millet
April	Spring	Corot
May	Wasp	Bonheur
June	The Cat Family	Adam

GRADE II.

Sept.	The Gleaners	Millet
Oct.	Primary School in Brittany	Geoffroy
Nov.	Pilgrims Going to Church	Boughton
Dec.	Arrival of the Shepherds	Lerolle
Jan.	Sistine Madonna (detail)	Raphael
Feb.	A Helping Hand	Renouf
Mar.	Dance of the Nymphs	Corot
April	Return to the Farm	Troyon
May	At the Watering Trough	Bouveret
June	Miss Bowles	Reynolds

GRADE III.

Sept.	Shepherdess Knitting	Millet
Oct.	Shoeing of the Horse	Landseer
Nov.	Departure of the Mayflower	Bayes
Dec.	Mother and Child	Murillo
Jan.	Christ and the Doctors	Hoffman
Feb.	Angel Heads	Reynolds
Mar.	Dignity and Impudence	Landseer
April	Sheep—Spring	Mauve
May	The Escaped Cow	Dupre
June	The Haymakers	Dupre

GRADE IV.

Sept.	Aurora	Reni
Oct.	Plowing	Bonheur
Nov.	Landing of the Pilgrims	Rothermel
Dec.	Divine Shepherd	Murillo
Jan.	Repose in Egypt	Van Dyck
Feb.	Washington	Stuart
Mar.	The Mill	Ruysdael
April	My Dog	Landseer
May	On the Prairie	Breton
June	St. Anthony of Padua	Murillo

GRADE V.

Sept.	End of Labor	Breton
Oct.	The Shepherdess	Lerolle
Nov.	Sir Galahad	Watts
Dec.	Holy Night	Correggio
Jan.	Madonna and Child	Murillo
Feb.	The Sheepfold	Millet
Mar.	A Distinguished Member of the Humane Society	Landseer
April	Avenue of Trees—Middleharnais	Hobbema
May	The Angelus	Millet
June	The Spinner	Maes

GRADE VI.

Sept.	Brittany Sheep	Bonheur
Oct.	St. Michael and the Dragon	Guido Reni
Nov.	Sheep—Autumn	Mauve
Dec.	Caritas	Thayer
Jan.	Age of Innocence	Reynolds
Feb.	Lincoln Statue	St. Gaudens
Mar.	Whistler's Mother	Whistler
April	Two Mothers and Their Families	Bougereau
May	Saved	Landseer
June	Chorister Boys	Anderson

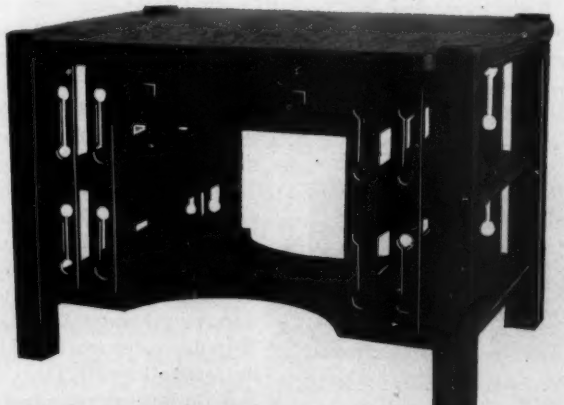
GRADE VII.

Sept.	Joan of Arc	Le Page
Oct.	The Fighting Temeraire	Turner
Nov.	John Alden and Priscilla	Boughton
Dec.	Madonna Granduca	Raphael
Jan.	The Last Supper	De Vinci
Feb.	Rembrandt's Mother	Rembrandt
Mar.	An Old Monarch	Bonheur
April	The Lake	Corot
May	Song of the Lark	Breton
June	The Tiger	Hunt

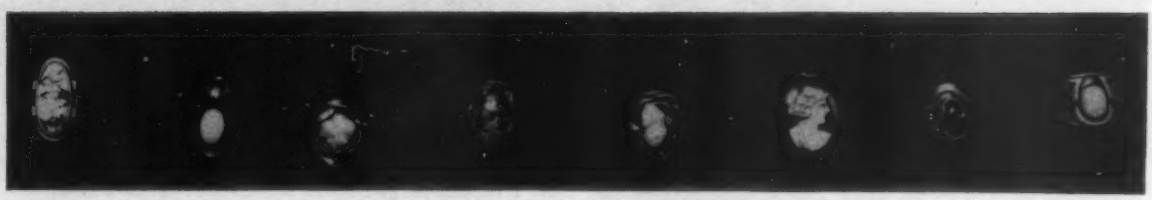
GRADE VIII.

Sept.	Aurora	Reni
Oct.	Portrait of a Youth	Velasquez
Nov.	By the River	Lerolle
Dec.	Sistine Madonna (original form)	Raphael
Jan.	The Prophets	Sargent
Feb.	Washington at Trenton	Faed
Mar.	Canal and Rialto	Photograph
April	Woman Churning	Millet
May	The Horse Fair	Bonheur
June	Landscape with Boat	Corot

We are all, supervisor and teachers, aware by this time that it means a great deal of work to study pictures in this way. This is no great surprise to us, however, because we have found out long since that satisfactory results in any line are brought about only by hard work. We expect the results from this method of study to repay us for our labor and influence the future lives of the children that are growing up under our care.



Designed and made in the Work Shops of the State Normal School, Oswego, N. Y.



Rings Designed and Executed by Mr. Sorensen.

HAND-WROUGHT JEWELRY

H. R. Sorensen, Proprietor Orno Shop, DeKalb, Ill.

(Fourth Article)

THUS far, our rule has been to select the stone first and to make it the center about which to form the design. Any color of a moderately hard stone may be selected, but it is advisable to select one with the cabochon cut. In making the ring described in this article, a green Chalcedony was used.

As can be seen by the accompanying sketches, Fig. 14, a variety of ideas in design may be worked around the outline of the stone. We make it our rule never to decide on any one design, until we have put at least three or four ideas on paper. This is not a waste of time, as it seems to some, for we often choose the second or third idea. It may be simply a modification of the first one, but we find something more pleasing in the design, the proportion, the size of the top, or in a line which harmonizes better with the stone.

In this, as in the previous problems, an effort is made to explain and illustrate the fundamental principles and methods of jewelry work by doing simple, tasteful pieces well, and gradually working our way into the difficulties and complications of advanced work. Hence, we are using silver, gauge 18 or 20, and are still working with the sawed out decoration. The sawing of a design in a ring already shaped is quite a different matter from the sawing of a design in a flat piece of silver. Gold work and greater complications are reserved for future articles.

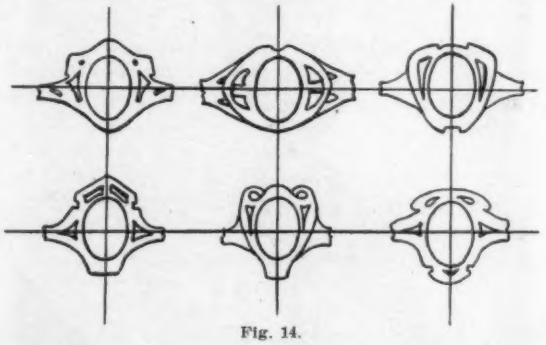


Fig. 14.

In selecting the stone and planning the design, the size of the finger is an important element. The finger size is usually measured by a card having a series of holes ranging in size from three to twelve, or by a series of rings numbering from one to thirteen. The sizes of ladies' little fingers run from three to five. The diameters of these ring measures from three to five, are as follows: Number three, 9/16″; number four, 19/32″; number five, 5/8″; and number six, 21/32″.

In order for one to know how long to make the piece of silver which forms the ring blank, so as to fit a finger of definite size, one may measure off approximately one and thirteen-sixteenth inches, which corresponds to a number three. To get a whole size larger, one should add three-thirty-seconds of an inch to this amount. To get two sizes larger, three-sixteenths of an inch must be added, etc.

It is understood, of course, that the design has been traced from the original drawing to tracing paper which is to be used thruout the problem. A center line should now be scratched on the silver, as shown at A, Fig. 15, when a symmetrical pattern is used, so that the crease in the tracing paper may be placed on this line.

The pattern shows that the cut-outs at the sides of the ring and nearest the bezel, are about 1/16″ from the bezel. If the pattern were transferred to the silver and the sawing performed before the ring is shaped, the distance from the cut to the bezel would be found to be different from that shown by the pattern. This must be avoided. Besides, the shaping of a ring after the cut-outs are sawed throws the edges of the openings at such an angle as to make an unpleasant appearance. A still further reason for shaping the ring before sawing the design is that it entirely eliminates all danger of breaking any of the parts of the sawed design.

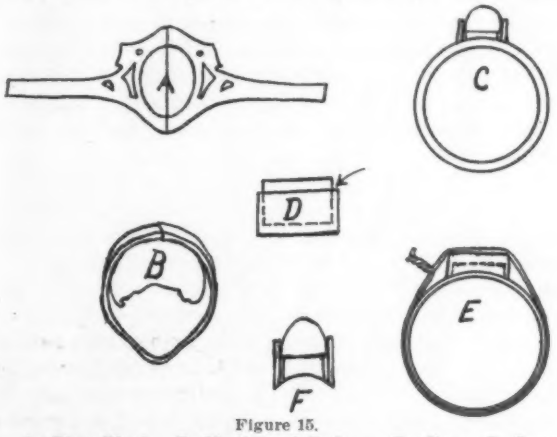


Figure 15.

A—Ring Blank. B—Meeting of Ends on Bending. C—Cross Section of Ring, Bezel and Stone. D—Double Bezel in the Making. E—Binding Wire in Place. F—Curve Filed in Base of Bezel.

Fig. 16. Shaping the Ring on Lead Cake.

Only the outline of the ring blank is transferred to the silver and sawed as close to the line as possible. The blank is then filed and finished. It is now ready to be shaped. For this process, an addition to our tool supply is almost necessary. This is a cake of lead with a half-round groove across it. See A, Fig. 16.

The outline of A, Fig. 15, shows how the ring blank should look before the shaping takes place. The blank is long enough to make a size 4 ring, that is 1 29/32″. Place the ring blank across the lead, the center being directly over the groove, as shown at B, Fig. 15 and A, Fig. 15. Hold the ring mandril on top of the blank over the groove and parallel to it. Strike the mandril with a rawhide mallet until the ends of the ring meet, as shown at B, Fig. 15. The ends are filed until they form a perfect joint which is then soldered. It is not necessary to try to make the ring perfectly round before the soldering is done.

The joint is soldered as suggested in other problems, by applying a piece of solder about 1/16″x1/8″ on the outside of the ring and covering the joint. The ring can be held with tweezers or placed on a charcoal block while the soldering is being done, either method being practical.

A few difficulties will probably arise at this point. The solder may flow on one of the ends only. This is due to the fact that one side of the ring has become hotter than the other. Both sides must be heated evenly. Another difficulty which frequently arises is that the ends spring apart before enough heat has been applied to fuse the solder. In such a case, stop applying the heat, force the ends together until they again meet perfectly, and try again. The possibility of this may be avoided by the use of binding wire, but it is unnecessary. Sometimes the solder will not melt entirely, merely enough to form a round ball at the joint. This means one of two things: It may be due to the fact that the joint was not properly cleaned, but it is probably due to the fact that not enough heat was applied. To overcome this difficulty, place a piece of charcoal close to the ring and on the opposite side from the one on which the flame is applied. This piece of charcoal helps to hold the heat which was otherwise wasted by going past the ring.

The ring is now ready to be cleansed with the sulphuric acid solution commonly called "pickle." It is then placed on the mandril and made round by the hammering of the rawhide mallet. Reverse the ring a time or two on the mandril to prevent its becoming cone-shaped.

After the ring is perfectly round, the design for the cut-outs should be transferred to it by placing the tracing paper around the ring so that the crease of the paper is exactly on the center which was scratched on the silver, and scratching the traced lines with a pointed tool.

A new and important part of this problem is the bezel. It was explained in a preceding article how to make a simple single bezel and to solder it to a flat piece of silver. But it is quite another matter to make a double bezel and to fit and solder it to a curved surface. The double bezel consists of two bezels, one inside the other. The inside bezel is a little lower than the outside one, thus forming a ledge for the stone to rest upon. If it were not for this ledge foundation, there would be considerable difficulty in setting the stone, as it would not rest evenly on the curved surface of the ring. C, Fig. 15, shows a cross section of the double bezel with the stone in position.

The outside bezel is first made to fit the stone, as explained in the March number, using a ¼″ strip of gauge 28 silver. A second bezel is made of the same material enough smaller to fit tightly inside of the first one. After the bezels have been fitted perfectly, the

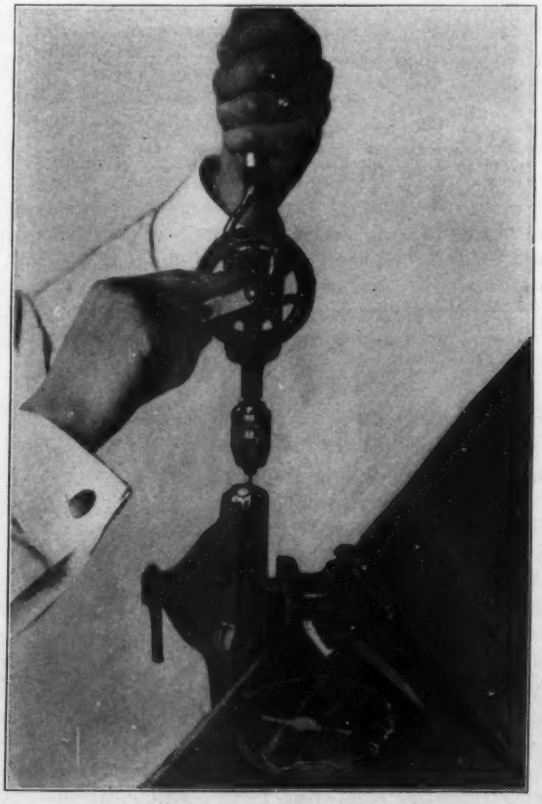


Fig. 17. Drilling Holes for the Cut-Outs.

tops of the two are filed flat and straight, using a flat medium file. The inside of the larger bezel and the outside of the smaller one should be perfectly cleaned to insure successful soldering together.

When the smaller bezel has been inserted in the larger one, it should project as shown at D, Fig. 15. They are then placed on the soldering block, and the borax solution and eight or nine pieces of solder on the edge indicated by arrow in D, Fig. 15. After the soldering, the bezel is pickled and then it is ready to be shaped to fit the ring. Saw off that portion of the inside bezel which projects. This edge of the bezel must now be filed with the curved side of the half-round medium file. While filing, hold the bezel between the thumb and three fingers of the left hand. File until the curve in the bezel, F, Fig. 15, fits perfectly the curve of the ring, and the bezel sits straight with the center line. When this perfect fit has been obtained, the bezel is soldered to the ring. It is advisable to wrap a fine binding wire around the ring and bezel, in order to hold them in the proper position. See E, Fig. 15.

The borax solution is applied and several pieces of solder are placed on the inside of the bezel, touching the ring. When the bezel is being soldered on, the ring should be held with tweezers. The reason is that this process requires considerable heat, and holding it in this manner, one can direct the flame to better advantage.

When the bezel has been satisfactorily soldered to the ring, the sawing is done. It is necessary to drill a hole where each cut-out is to be. A drill like the one shown in Fig. 17, can be bought for a small sum, and will be most useful in this and other problems to follow.

Before commencing to drill, an impression should be made with the punch to prevent the drill from slipping. The ring may be held by placing it on a round piece of wood and holding it in the groove of the lead cake, or by placing it in a ring clamp, as shown at B, Fig. 17.

Great care must be used in sawing to prevent injuring the shank of the ring and making it necessary to refinish it. The cut-outs should be finished with needle files.

If a transparent stone is to be used, the part of the ring inside the bezel should be sawed out.

After the ring has been finished with emery cloth, the setting of the stone takes place. In order to hold the ring securely, use a ring clamp. The stone is placed into the bezel which is examined as to the height necessary for the setting of the stone. If the stone has a low cabochon cut, the bezel may be made quite low. If the stone has a high cut, the bezel must be left high above the ledge of the inside bezel.

The actual setting is done by forcing the bezel to the stone, exactly as described in the March number.

The final step is the oxidizing, which has been fully described in previous articles.

A HANDY KINK FOR THE DRAFTING ROOM AND THE SCHOOL DRAWING ROOM.

Wm. C. Unverferth, High School, Hammond, Ind.

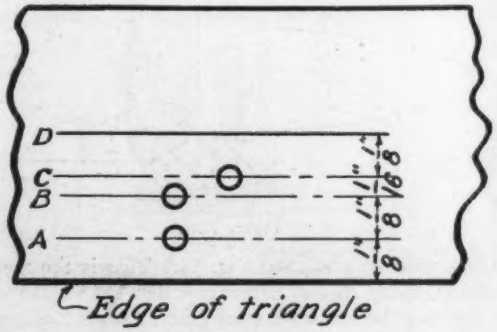
SOME time is always spent with a considerable amount of drudgery in measuring and drawing guide lines for freehand lettering. All of this measuring can be eliminated by boring a few holes thru one of the triangles, any rectangular piece of celluloid (a part of a broken triangle may be used), or some other suitable material, so that the pencil point will pass thru, without much play, and make a line on the paper.

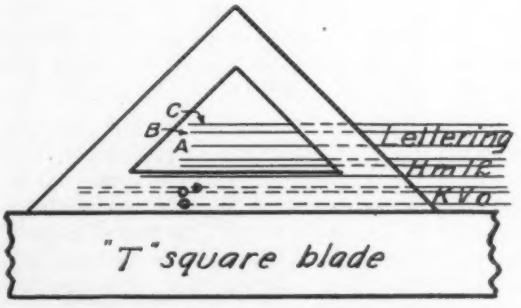
If the triangles are transparent, an extra tool may be saved if the holes are bored in one of them. A hole 1-16″ in diameter will be large enough and will compel one to keep his pencil sharp, a habit which is hard to develop in a beginner.

Bore the holes as shown in Fig. 1. The line, D, is scratched on the triangle with a needle or a knife. The holes need not be placed in a line, but care must be taken to get their centers the correct distances apart. If many are to be made, as in a school drawing room, one may be made accurately and then used as a template.

To use the triangle (See Fig. 2), place it on the top edge of the T-square and move up or down until the holes are in the required place for the lettering. Hold the T-square firmly, place the pencil point in one of the holes, and draw the line by sliding the triangle on the T-square. The three lines, A, B, C, are drawn without moving the T-square. If more guide lines are wanted, move the T-square and triangles downward until the line that has been scratched on the triangle, D, coincides with line A, and draw the three lines again. Repeat the process as often as necessary. The lines may be drawn by beginning with the bottom lines and going upward.

The measurements given in Fig. 1 are for lettering 3-16″ high with ⅛″ for the body of the lower case letters, and ⅛″ distance between the lines of printing, as shown in Fig. 2. The measurements may be made suitable for any size or style of letters.





PRACTICAL SCHOOL SHOP FORGING

Thomas Googerty, Pontiac, Ill.

(Fourth Article)

Exercise No. 6.

Staples are used for hasps, gate hooks, and for various other purposes. They are made from all sizes of stock, depending on the use to which they are put. Soft steel is the best stock to use in making staples, on account of its pliability.

The length to cut stock is shown in the drawing of the staple in Fig. 66. The stock is caught at one end with a pair of light tongs. The piece is then heated and drawn out to a point; it is reversed in the tongs and the

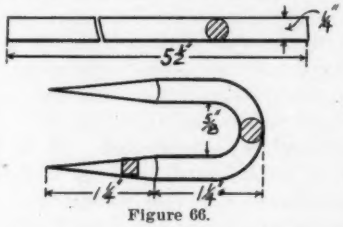


Figure 66.

other end drawn out. The center of the piece is then reheated and bent into shape over the horn of the anvil.

In drawing any piece of stock to a tapered point, the taper should not be hammered on one side continuously and, when turned over, hammered back again. To have a taper on all four sides alike, the bar must be

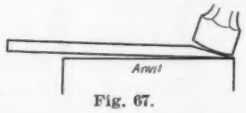


Fig. 67.

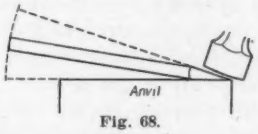


Fig. 68.

raised the proper distance and not laid flat on the anvil. Fig. 67 illustrates the wrong way and Fig. 68, the correct way.

Exercise No. 7.

In Fig. 69 is shown a drawing of an open link. Open links are used in the splicing of broken chains. In splicing a chain, the link is opened by driving a chisel between the laps, or it is opened when made. These laps are hooked into links of broken chain and

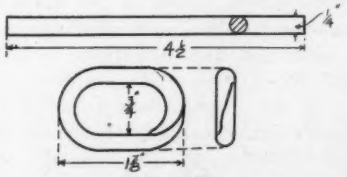


Figure 69.

then driven together. In making the link, one end is drawn to a flat point and a hook is hammered on it. See Fig. 70. The other end is heated and drawn out as in Fig. 71. The center of the piece is now heated and bent over the horn of the anvil to the desired shape. See Fig. 72. Notice in the drawing that the hooks at the open end of the link are not very long. They should not be made longer than shown.

Exercise No. 8.—Welding a Chain Link.

The form and length of the stock for this exercise is shown in Fig. 73. The link may be made from iron

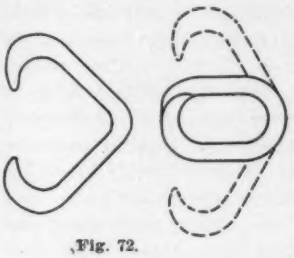


Fig. 72.

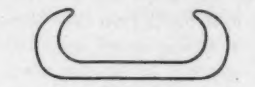


Fig. 71.

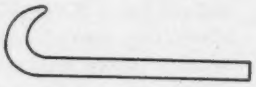


Fig. 70.

or soft steel. After the stock is cut, it is heated in the center and bent over the horn of the anvil into a "U" shape. See Fig. 74. The ends are now heated, and

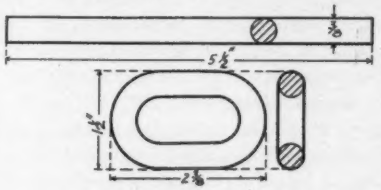


Fig. 73.

Fig. 74.

scarfed by setting them on the anvil as shown in Fig. 75. The iron is then struck on top with the hand hammer. After each blow, it is moved away from the anvil just a little, giving the end a bevel, so that, when finished, the scarf consists of a series of slanting notches.

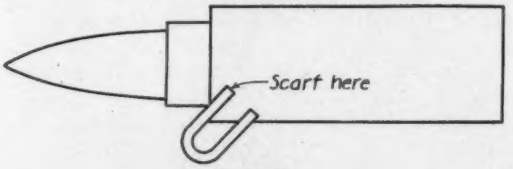


Figure 75.

In scarfing, both ends of the links are set on the anvil. The end of the one on the right hand side must not be moved when scarfing the other. After each blow of the hammer, the piece is moved just a little. If it is moved too far and the other end of the link is fixed it

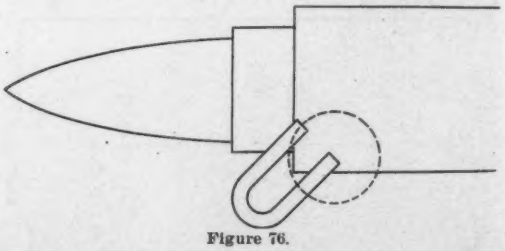


Figure 76.

will describe an arc. See Fig. 76. This is the method used in scarfing links. Sometimes they are welded without scarfing, but it is not good practice.

Fig. 77 shows the link scarfed, lapped and ready to be welded. In welding, the heat is taken directly on the end of the lap and not on the sides, so as not to burn

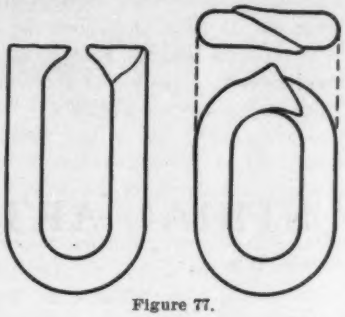


Figure 77.

the stock above the laps. When the link has the welding heat, it is taken to the anvil and hammered on the flat sides, then set on the horn of the anvil, and hammered on the corners. See Fig. 78. The shape of the link at the weld should be just a little pointed for a strong link.

In making chains, do not weld two single links and then one between them. Weld a link on the end of the chain and keep repeating until finished.

Exercise No. 9.

Punching holes thru hot iron is not a difficult exercise. For instance: A 3/8" hole is to be punched thru a flat piece of iron or steel. The piece is heated, taken to the anvil and a punch set on the spot to be punched.

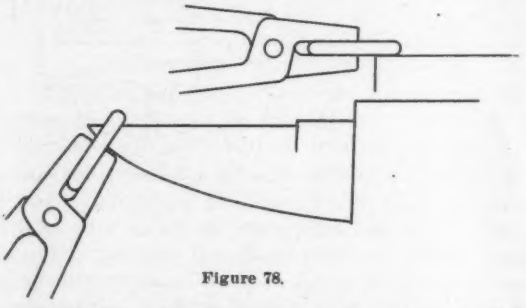


Figure 78.

The punch is struck three or four blows with the hand hammer driving it into the metal as shown in Fig. 79. The piece is then turned over and the punch is set over the dark spot which is caused by the former blows, and is driven thru. See Fig. 80. Square and other shaped holes are punched in the same manner. Thin stock is punched cold. In doing this, the piece to be punched is set on the punch block and the punch driven thru the metal into the hole of the block. A punch-block is a round or square block of steel with one or more tapered holes thru it. See Fig. 81.

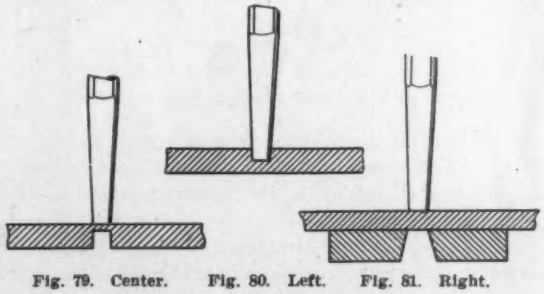


Fig. 79. Center. Fig. 80. Left. Fig. 81. Right.

Figure 82.

Fig. 82 shows some holes that could be punched while the metal is hot. A hole like the one shown at A, is made with a punch of that shape; the next hole is made with the same punch. Afterwards the hole is upset or shortened by heating and cooling each side of the hole.

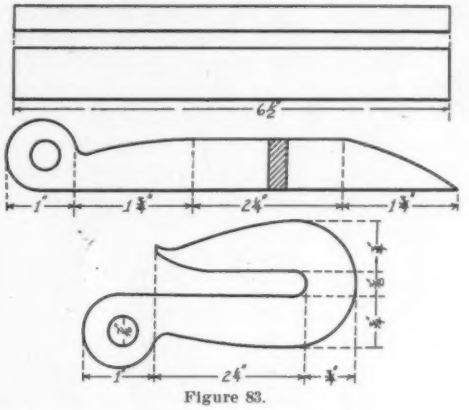


Figure 83.

The bar is then hammered on the end. This shortens and spreads the metal. The hole is made true by driving a round punch thru it. The stock used for this exercise should be soft steel.

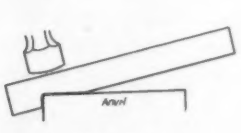


Fig. 84.

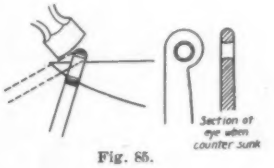


Fig. 85.

Exercise No. 10—A Grab Hook for a Log Chain.

Figure 83 shows a drawing of the hook with size of stock to be used. The stock should be mild steel, 6½x¾x⅜ inches. To form the eye one end is heated and shouldered back one inch from the end, by hammering it on the anvil as shown in Figure 84. The eye is then rounded with the hammer and the hole

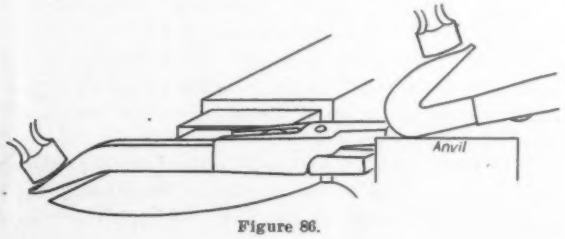


Figure 86.

punched with a hand punch. The hole is countersunk

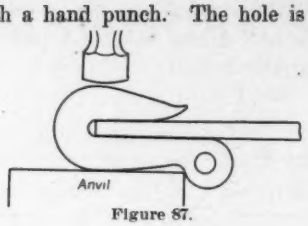


Figure 87.

by hammering it on the horn as shown in Figure 85. The point is next drawn out and then the hook is heated in the center. It is cooled each side of the center and hammered over the horn to bend, then on the anvil as shown at Figure 86. A piece of ⅜-inch flat iron is set on the inside of the hook and the hook hammered to fit the iron. This leaves the opening of the hook uniform and just the size required. See Figure 87.

"BRICKLAYING---AN INDUSTRIAL ART"

Wm. T. Gohn, Stout Institute, Menomonie, Wis.

(Second Article)

Bricklayer's Tools and Their Application.

BEFORE entering into the discussion of the various phases of work, a description of the necessary tools and their application is advisable.

The bricklayer's first and most essential tool is, of course, the trowel. This tool is manufactured in various shapes and sizes, of which I have shown four of the leading shapes.

Fig. 1. London.

Fig. 2. Philadelphia.

Fig. 3. Round Heel.

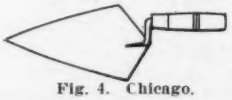


Fig. 4. Chicago.

Fig. 5. Pointing Trowel.

Figure 1 represents the once famous "Brades" or London pattern, used especially in England and by some of the Eastern mechanics, due to its sterling qualities in the process of "buttering."

Figure 2 is the standard "Rose" or Philadelphia pattern, known for its fine quality of steel and its balance. Most bricklayers prefer this type of trowel in that the weight of the blade is carried well back to the handle and being broader at the heel, enables them to lift and thus string or spread a larger amount of mortar.

In Figure 3 I have represented the round heel trowel, which most authorities claim the best and most durable trowel for cutting brick. This type of trowel is not popular with most bricklayers.

The "Chicago" pattern, represented in Figure 4, is the new style trowel, and is much similar to the Philadelphia pattern, only that it is about an inch wider at the heel. Its extra width tends to make the blade appear rather short. It is an excellent trowel for use in the western or stringing method.

In speaking further of bricklayers' trowels as shown in Figures 1, 2, 3, 4, which measure from ten to thirteen inches and weigh on an average of one-and-one-half pounds, it would be well to mention the type of trowel as illustrated in Figure 5. This trowel is known to the trade as the pointing trowel, the blade of which measures from four to five inches in length. It is not used to convey mortar from the mortar-board to the wall, but for the treatment of the joints of the wall, during the process of construction.

At various times, in all brick construction, it is necessary to use not only whole brick but also parts of brick. In order to obtain these parts or pieces of brick, the mason follows one of two methods: (a) by a series of blows with the edge of the steel blade of the trowel, or (b) by the bricklayers' "set" or chisel illustrated in

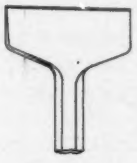


Fig. 6. Chisel.

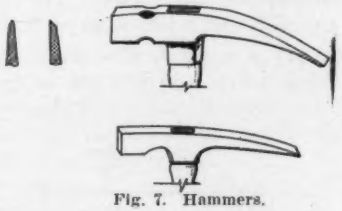


Fig. 7. Hammers.

Figure 6, with the aid of the bricklayers' hammer illustrated in Fig. 7. The first method is used only on common or rough work, while the latter is the method employed on face work requiring neatness and exactness. The bricklayers' "set" is usually made from octagon tool steel, drop-forged until the cutting edge is about 4 inches in width.

Figure 8 represents the cold chisel, with a cutting edge of from ½ to 1 inch, which is used in cutting thru masonry. The diamond pointed drill, Figure 9, is best adapted for drilling holes.

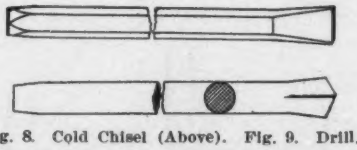


Fig. 8. Cold Chisel (Above). Fig. 9. Drill.

Aside from the pointing trowel, Figure 5, there are certain other tools which the bricklayer uses for applying the several finishes to the mortar joints. The following are the most important:

The steel jointers, illustrated in Figure 10, are used to make a "concave" or a "convex" joint. The latter

is sometimes termed a "beaded" joint. The convex tool may be procured in two styles, Figures 10 and 11.

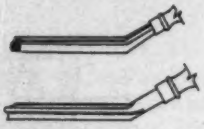


Fig. 10. Jointers.

Fig. 11. Beading Tool.

Another tool of the bricklayers' equipment is the knife or "Frenchman," Figure 12, used in making the "rodded" joint, but its use is fast becoming obsolete.

Since bricklaying is a skilled art, it follows that the bricklayer must be an educated artisan, having his brain and body trained to the application of the various tools used in construction. To be artistic, brickwork must be accurate, and to insure accuracy, certain instruments of precision are necessary.

The leading tools of precision and accuracy used by the bricklayer are the Straight-Edge, or level-board; Level Plumb-rule; steel Square, and Line.

Fig. 12. Frenchman.

The Straight-edge, Figure 13, is made of a long piece of selected pine, having the following dimensions, 1¼ inches thick, 6 inches wide, and 12 feet long. It is used to level between two points not connected.

Fig. 13. Level Board.

Figures 14, 15, 16, illustrate the various ordinary types of levels used by bricklayers. This is the most sensitive instrument used in the trade and consequently requires careful handling, so as not to impair its accuracy. This tool is not merely a level, but is also provided with a plumb-glass. This type of plumb-rule is rapidly replacing the common type of plumb-rule, illustrated in Figure 17.

Fig. 14. Level.

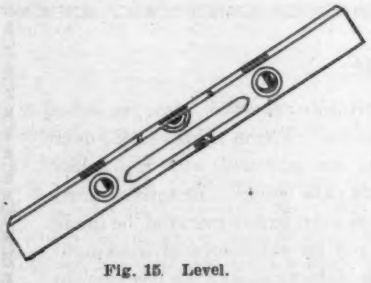


Fig. 15. Level.

Fig. 16. Plumb Rule and Level.

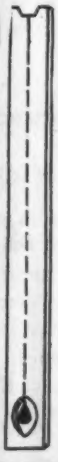


Fig. 17. Plumb Rule.

The Plumb-rule, Figure 17, consists of a selected piece of pine usually 1 inch thick, 4 inches wide, and from 3 feet 6 inches to 4 feet 6 inches in length. The edges are made perfectly parallel with a center line

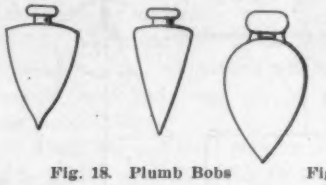


Fig. 18. Plumb Bobs

Fig. 19. Hank (above) Lines.

gauged on each of its 4-inch surfaces. Near the bottom an oval or rectangular hole is cut to permit the plumb-bob, Figure 18, to swing freely. The bob is suspended from a saw cut at the top of the plumb-rule by a piece of mason's line illustrated in Figure 19.

The Steel Square, Figure 20, is another of the mason's tools of accuracy, and consists of a blade and tongue. The blade is two inches wide and 24 inches long, while the tongue is an inch-and-a-half wide and eighteen inches long. It is exceedingly valuable in laying out small angles or corners and for testing the squareness of piers and chimneys.

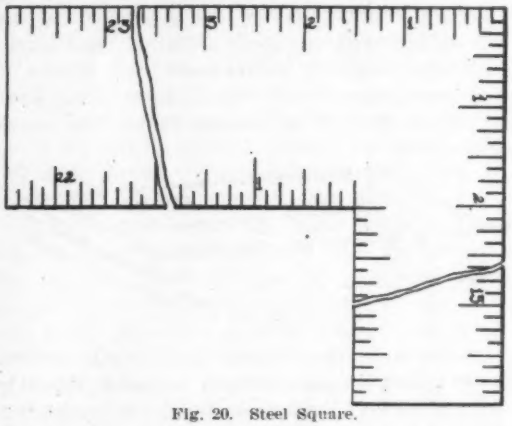


Fig. 20. Steel Square.

The stringing of the "bob" in a plumb-rule is not the only use to which the mason's line is put. It is also used to stretch between two or more corners of piers, serving as a guide for the construction of work in the

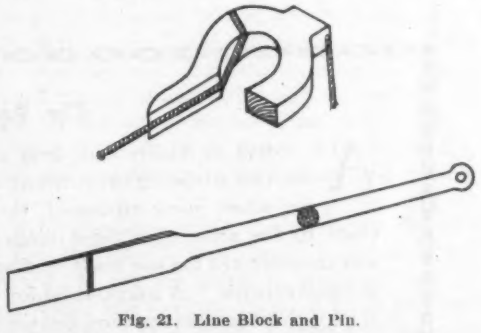


Fig. 21. Line Block and Pin.

intervening space. In order to fasten or hold the line in place at the extremities the bricklayer uses one of two methods: (a) by the use of line blocks or line pins,

Figure 21. The method of using the line block is illustrated in Figure 22. The block consists of a piece of soft wood carved or cut to the shape as illustrated in Figure 21. The method of attaching the line is also illustrated.

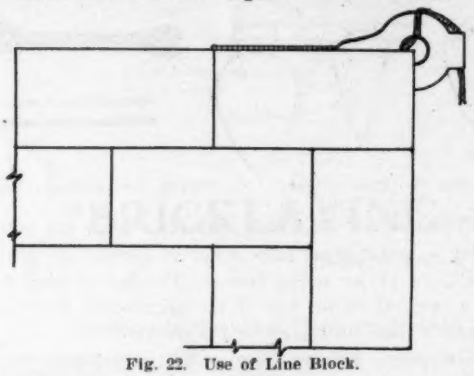


Fig. 22. Use of Line Block.

This type of line block is an improvement over the old style of block in that it is so designed as to permit the mason to have an unrestricted view of his corner during the process of construction. The line pin is used chiefly to fasten the line on an interior angle or corner. This is done by winding the line about the pin and inserting the blade in a vertical joint in such a manner that the line will coincide with the upper arrises of the brick in the course along which it is stretched.

The more general tools or instruments of the trade are the Mortar Box, Mortar Board, Shovel, Hoe, Sand Screen, and Hod.

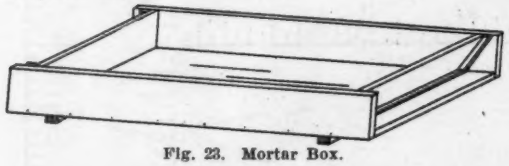


Fig. 23. Mortar Box.

The mortar box is made of cheap pine or hemlock lumber and designed as illustrated in Figure 23. The inside dimensions of the box are usually 4 feet by 7 to 8 feet, and 1 foot in depth. This box is used for slaking the lime and mixing the mortar. For the process of slaking lime and mixing mortar the hoe is used, Figure 24. The type of hoe most preferred for this kind of work is one having a blade about ten to twelve inches wide and with two holes thru it as illustrated. A shovel

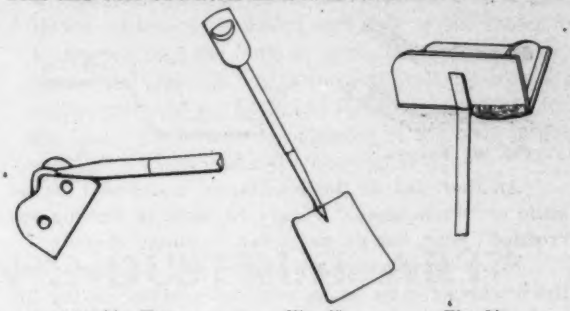


Fig. 24. Hoe. Fig. 25. Fig. 26.

of the type, shown in Figure 25, is used for conveying the mortar from the mortar box to the hod. Any standard No. 2 shovel will serve the purpose. Figure 26 represents the hod, which is used to convey the mortar to the various workmen.

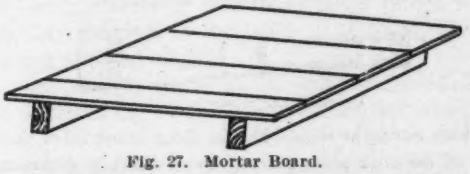


Fig. 27. Mortar Board.

The mortar-board, Figure 27, is the receptacle for the mortar delivered to the masons by their helpers. It is usually 2 feet 6 inches by 3 feet.

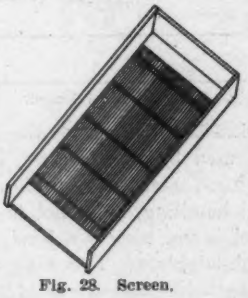


Fig. 28. Screen.

In Figure 28 is shown the common type of sand screen used by the mortar mixer to remove the pebbles from the sand before making the mortar.

The Value of Quality

ALL works of quality must bear a price in proportion to the skill, time, expense and risk attending their invention and manufacture. Those things called dear are, when justly estimated, the cheapest; they are attended with much less profit to the artist than those things which everybody calls cheap. Beautiful forms and compositions are not made by chance, nor can they ever, in any material, be made at small expense. A composition for cheapness, and not for excellence of workmanship, is the most frequent and certain cause for the rapid decay and entire destruction of arts and manufactures.—RUSKIN.

GILDING THE EDGES OF A BOOK

James E. Mead

APPLYING gold leaf to the edges of books and making it remain there permanently, is a somewhat intricate process requiring a certain amount of skill, which comes only with practice. The beginner should try it on some book which he does not prize very highly, as the first trial will probably result somewhat unsatisfactorily.

The gold leaf which is used is pure gold, 14 carats fine. The gold leaf which is used in a bindery is known as "long edge" gold. It is sold in books of 25 sheets, 3⅝"x3⅞".

Tools and Material.

The following tools and materials are used in the process altho the agate is not altogether necessary:

A press or vise for holding the book.
A "frame" for picking up the gold leaf.
A cabinet scraper, shaped as shown in figure 1.
A bloodstone for burnishing the gold.
An agate.
A camel's hair brush.
A clothes brush.

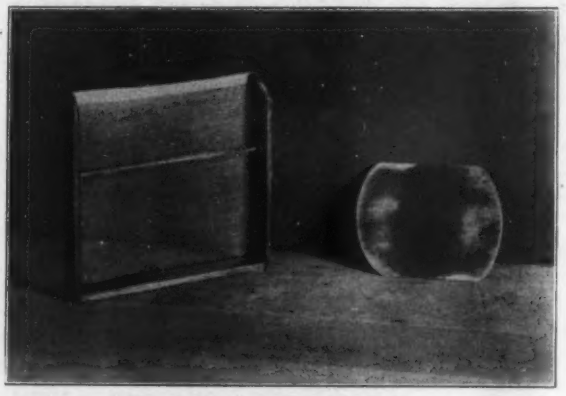


Fig. 1. Frame and Cabinet Scraper.

A small sponge.
A small quantity of burnt umber.
A piece of beeswax.
A small quantity of bookbinders' paste.

The frame consists of three thin pieces of wood about four inches long and ¾" wide, tacked together as shown in figure 1, with chiffon pasted on it. The loose ends of the side pieces are drawn together when the chiffon is pasted on, and then the small piece is forced in to stretch the chiffon. The outer edge of the chiffon should be a "selvedge".

The agate is a stone from one-and-a-half to two inches long by one-fourth inch thick, securely set in a brass socket which is set on a handle about fourteen inches long. It can be purchased from a bindery supply house for $2.50 or $3.00.

Bloodstones range in size from one-half to one-and-one-half inches in width and from three-sixteenths to one-fourth inch in thickness similarly mounted on a handle. See Figure 2. They can be purchased for from five to twenty dollars.

A good paste may be made as follows: Rye flour, 4 ounces; alum, ¼ ounce; water, 4 ounces. Rub to a smooth paste and pour into ½ pint of boiling water; heat until thick.

Place the unbound book in the press, with the edge to be gilded up. In order to get good pressure on the edge, put two beveled or wedge-shaped boards in the press with one on each side of the book, with the thick edge of the bevel-boards even with the upper edge of the book. Care should be taken to have the grain of both boards run the same way as the book and boards must be scraped and the edge must be smooth. When the press is tightened, this will put the greatest pressure on the edge of the book, which is desirable. In the bindery, we put as many books in the press as it will hold, and put bevel boards between the books. See Figure 2.

Mix a little burnt umber in water and apply the mixture to the edge of the book. The purpose of this is to moisten the paper so that it can be scraped and also to color the edge so that you may know when you have scraped the entire book. With the cabinet scraper, scrape the edge of the book and the bevel-boards the same as tho they were a board. Always scrape in the same direction. If you scrape against the grain of the boards, the boards will not be perfectly smooth and paste will later work down around the outside leaves of the book. After the scraping, the book may be sandpapered.

Apply burnt umber and water again to the book with the sponge. The purpose of this application is to color the edge which will show thru the gold and make the gold appear a darker color. It also prevents pinholes in the gold from showing white. Now brush the book with the clothes brush. Brush it vigorously and remove all sediment from the paper. Thin the paste with water until it is like syrup. Apply a coat of the paste to the edge of the book with the sponge, as a brush will make streaks. Rub the paste in and wipe off all superfluous paste.

If you intend to do much of this work it will pay you to get a gold knife and to make a cushion on which to cut the gold leaves. Put a layer of cotton about one-half-inch thick on a board and stretch a piece of chamois or sheep skin over it. Stretch the leather tight and tack it to the board. A case knife may be used for cutting the gold if only one or two books are to be gilded. Note that the cushion shown in Figure 2 has upright boards on two sides to prevent a draft from striking the gold leaf.

Mix three teaspoonfuls of alcohol in a cup of water and put the camel's hair brush in it so it will be "handy." If you are going to gild only one or two books, it will not pay you to get a knife and cushion. Lay the book of gold where a draft will not strike it and open the cover. Apply the alcohol and water to the book over the paste. Rub the chiffon of the frame across your hair to magnetize it and touch it to the

Fig. 2. Bloodstone in Use.

gold, which will adhere to it. Place the gold over the place on the book where you want it to be and blow lightly on the back of the chiffon and the gold will leave the chiffon and stick to the book. A few wrinkles in the gold will do no damage. If the gold did not go on the place where you intended it to go, leave it where it is and try another sheet, letting the second sheet go partly on top of the first.

If you have a cushion, pick the gold up and put it on the cushion, using the frame as directed above. Cut the sheet to fit the book using the gold knife. Then pick up the gold with the frame and put it on the book. Always allow the gold to lap over the edges and over the sheet of gold next to it.

Some gilders use a mixture of egg albumen and water instead of the alcohol and water. They mix one part egg albumen or white of egg to five parts of water. This mixture is called glaire. I find that the alcohol and water works more satisfactorily than the glaire.

When the edge of the book is covered with gold, allow it to dry for 15 or 20 minutes. Then rub the beeswax on a paper, place the paper with the waxed side up, on the gold and rub the waxed side of the paper with the agate or bloodstone. We use the agate, but the bloodstone will work altho not so satisfactorily. This rubbing presses the gold down to the book. Now rub the beeswax over a smooth board in order to wax the board. Carefully brush away all crumbs of wax as a small particle of wax will streak the gold. Then rub a cloth over the waxed board in order to get a small amount of wax on the cloth. Now rub the cloth over the gold in order to wax the gold and to brush away the surplus.

Burnishing.

Be sure that the bloodstone is clean, and holding it as shown in the photograph, burnish the gold by rubbing across the leaves of the book. This rubbing heats the gold and burns it into the paste and the paper. Be very careful that no dust or dirt gets under the bloodstone or it will scratch the gold. Burnishing will require some practice as the beginner must learn not to dig the edge of the bloodstone into the book.

If there are any scratches or holes in the gold, dip a small pencil brush in water and dampen the paper where there is no gold. Then cut a piece of the gold leaf a little larger than the hole and place it over the hole. When dry burnish with the bloodstone.

If you have been unsuccessful, the first time, scrape off the gold, scrape the book smooth, and try it again.

If you wish to have the edge of the book red under the gold, use eosin and water instead of the burnt umber and water.

Editor's Note—Mr. Mead is an expert gilder and devotes his entire time to the work in one of the largest binderies in the world. After preparing this description of the process, he handed it to me and asked me to compare the description with the process, as he gilded a book. I did so, and this is a correct description of the method he used in putting the gold leaf on the edge of a book. —W. H. H.

Vocational Education and the Superintendents

THE importance of the problems of vocational education as they confront the school superintendents of the United States was expressed recently at the Richmond convention of the Department of Superintendence in the fact that an entire day was devoted to the administrative aspects of trade, part-time, continuation, shop and rural schools, and to the distinctions between vocational and liberal education. Some of the significant expressions which may be of interest to supervisors and teachers are reproduced below:

Fundamental Distinctions Between Liberal and Vocational Education.

"The great danger now is that we shall pour public money into sham vocational education. Manual training is good as a part of liberal education, but it is only make-believe vocational education. The household arts instruction of our high and elementary schools, considered as an element of general education is excellent, but we must not allow it to masquerade as true vocational training for women's trades or for home-making. Agricultural instruction in High Schools of general education is good, but it is our duty to warn the public that, as ordinarily carried on, it has little more to do with the making of successful farmers than Latin or Algebra."

"We must learn that true and efficient vocational training is something vastly different from general or liberal education, especially in secondary schools and colleges. True vocational education must not be bookish; it must center in the shop, or the field, or in the home. Its teachers must first of all be people who have had the training and the practical experience which would enable them to succeed as trade workers, farmers, home-makers or as followers of a hundred other special occupations which must eventually be taught in a new type of vocational public school. There will always be a place in vocational education for theoretical, technical, or academic instruction—but it must be a secondary place. Practice of the art itself, the requirements of the calling taught, must

be given first place, whether in commercial shops and on actual farms or in school shops or on school farms run on a commercial basis as far as practicable."

"Liberal education should aim primarily to develop the qualities that make a man the right kind of a man apart from his special calling. It should give him tastes, appreciations, interests, insight, ideals, that lie outside of his vocation. Vocational education must aim to make a youth proficient in some one calling—never losing sight of the requirements that in modern life the average man can only hope to succeed by equipping himself well for his special trade or pursuit."

"But vocational education must make the producer rather than the consumer of utilities. Liberal education seeks to produce the broad, appreciative man; vocational education the intense, skillful productive man."

"Because of their different aims, the two forms of education require essentially different methods. The processes of effective vocational education will have to be learned largely from the work shop, the farm, the commercial establishment and the home. Fake or imitation vocational education is going to show itself unwilling to be subjected to the tests of practical men. Never did the schoolman run to so great danger of forfeiting public confidence as in promoting vocational education. He needs to pray for wisdom, for modesty, for the power to learn from practical men and women."

Dr. David B. Snedden,
State Commissioner of Education in Massachusetts.

Pre-Vocational Education.

All education, all training is pre-vocational; is now, has been, and shall be. Purely vocational subjects have no place in the upper grades for the simple reason that no one knows at this stage in the progress of children what they ought to follow in life.

We must distinguish, however, between learning a vocation and using the activities of the world as a means of guiding the schools in the choice of subject matter.

All girls, in whatever grade in the schools, are potential home-makers. This is a fundamental instinct in every girl which should be utilized in determining the best form of education. Girls, therefore, should have an opportunity to engage in activities connected with the home such as cooking, sewing, art, home decoration, design, sanitation, hygiene, etc.

All boys of this age delight in motor-activity. They love to do things and should be given an opportunity to do things, to make things in wood and metal, to have good instruction in both freehand and constructive drawing, as drawing is essential to success in construction.

The upper grades are for the education and training of children. Strictly vocational work has no place in the upper grades. This should be provided in trade schools. The trade school belongs in the public school system but not in the upper grades of the regular school course.

Supt. W. A. Greeson.
Grand Rapids, Michigan.

Culture and Leisure.

"People are rapidly learning that a college or university diploma does not necessarily spell culture. We are too prone to call cultured the agriculturist whose hands have never touched the plow, but whose knowledge has come from books, papers and colleges; too prone to call cultured the surgeon whose knowledge is deep only from long years of study and reading, yet whose hands have never wielded the knife in removing or correcting some disorganized portion of human anatomy. That culture which has zeal without practical knowledge and enthusiasm without sanity, should no longer sit with the mighty. We admire and love real culture; that culture which brings peace, happiness, and contentment to the community; which builds homes, rears families, gives them the conveniences of life, and some of the luxuries; which makes one know and love his neighbor, and be interested in the affairs of the town, the state, and the Nation; a culture whose mission is objective and not always subjective. The prevalent idea that a college or university education is synonymous with culture, coupled with the idea that culture and work are foreign to each other, is one reason why we have so many young men in college and coming from college with no fixed idea of the future, no sane view or thought of life's work; with faculties practically wild and undisciplined, without willingness to do as they are told and without that disciplined faculty of concentrating their attention on unpleasant work or necessary tasks. The term "Cultural" is too closely allied to a life of ease and luxury; and this so-called cultural education, for such a life and not one of work, not for a life which finds real happiness in work and life's material things."

F. W. Thomas, Supervisor of Apprentices,
Santa Fe Railway System.

Ends of Vocational Instruction.

Pestalozzi said, "The end of instruction is making ideas clear," and, "Impressions and expressions united lead to clear ideas." If this is so, then the best way to produce clear ideas is not by applying the instruction at some subsequent period, but in connection with the teaching. The learning process, considering both the teacher and the pupil, seems to follow somewhat this order: Explanation; demonstration or illustration; application; repetition; with a judicious mingling of these elements of teaching and learning. The school is the place where the teacher explains and demonstrates; the shop, store and home the place where the pupil applies and repeats the process, until he has learned that which the teacher taught. Back and forth from the school to the shop and store, from the store and shop to the school, the teaching and the learning go on side by side—Explanation and application; theory and practice; study and work; until by sufficient repetition the process has been learned and the teaching has been forgotten.

But we must not forget that it is to be educational work—not so much work, for work's sake, but work for the workers' sake,—so organized and directed as to give a maximum of educational value—a value which will be measured largely by the joy of accomplishment; the consciousness of difficulties overcome and made the stepping stones to higher accomplishments. And to this end the industries, as well as the schools, must be organized with reference to vocational education that is liberal and fundamentally sound; for I believe we may obtain the elements of a liberal education from work-study, when rightly organized, quite as much as from word-study.

In developing our plans for industrial education, and other forms of education as well, we need to be on our guard that we do not imprison the soul. The routine and the mechanical must be so taught and learned and practiced, that there will still be opportunity for the cultivation of those soul-qualities that give joy to work, and that find in the humblest tasks, opportunities for expanding self-expression.

Supt. J. R. Condon.
Cincinnati, O.

Vocational Education.

Vocational teaching should be introduced into the grammar grades because a great majority of pupils do not reach the secondary schools. Work of this character is also desirable in the grades because many pupils who do not succeed well and who are not interested in academic studies would otherwise withdraw and shorten their school period.

It is further desirable in that it reveals to the teacher the individual taste and aptitude of the pupils, and it is only thru such knowledge that the teacher may give any intelligent advice toward vocational guidance.

An informal period during each day should be established, during which time activities of a general nature appealing to the many-sided capacities of children, should be introduced. Under such informal and liberal work the child reveals himself to a greater extent than is possible under formal and restricted programs. The native power finds opportunity of expression, and his interest is aroused.

I. I. Cammack,
Superintendent of Schools, Kansas City, Mo.

The Normal School and Vocational Education.

The Twentieth Century Normal School is a vocational institution. It is not a college, does not intend to become a college, never will be a college.

A majority of all American Normal Schools will always be agricultural in their purposes and their attitudes.

President John R. Kirk,
Missouri Normal School, Kirksville, Mo.

In its resolutions the Department expressed itself as follows:

"We indorse the movement to establish and support vocational schools for pupils over 14 years of age; we urge the special preparation of teachers for this vocational work; we encourage the establishment of continuation schools for boys and girls between the ages of 14 and 18 years who have entered vocational life; we recommend that the attendance upon these continuation schools be made compulsory for such boys and girls between the ages of 14 and 16."

INDUSTRIAL-ARTS MAGAZINE

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EDITORIAL

INDUSTRIAL EDUCATION AND ORGANIZED LABOR.

The New York "World," of February 1st, devoted a half-page to an interview with a retired manufacturer, giving his opinions as to the reason "Why the Boys of New York City do not Learn Trades." Under the subtitle, "Uselessness of Vocational Schools," he says:

"We hear a great deal these days about vocational schools and how they are to prepare boys to go right out into the world and make a living. Personally I believe in vocational schools, but only if the government which provides them is prepared to support a graduate of one of them in his right to work at the trade he has been taught there.

"But what are the facts? A boy may be graduated from a vocational school and not only will the trade union prevent him from taking a job but it will not even count the time he has spent at the school as part of an apprenticeship. The boy has to spend just the same length of time as an apprentice before he is allowed to become a journeyman as if he had never been to the vocational school. Now if that isn't reducing the vocational school idea to a farce I'd like to know. What's the use of taxing the people to maintain vocational schools if the graduates have to start all over again as soon as they've been thru the course?"

Unfortunately, there is an element of fact in these statements. In some cities it is impossible for a person to secure employment as a plumber unless he carries a union card, and it is impossible for a boy to be apprenticed to the plumbing trade unless he is the son of a union plumber. In such a community it is useless for a school to establish a plumbing course open to all boys, unless the school wishes to become a party to a scheme to oppose the trade union.

Nearly every trade union makes some restrictions upon the number of apprentices which may be employed. In some cases the number is one apprentice to every five journeymen employed, and in others the number is one apprentice to every ten journeymen. Nearly all unions refuse to recognize the time spent in a vocational school as a part of apprenticeship.

It is not our purpose to approve or condemn the unions for their attitude. No doubt they feel that these rules are necessary to the maintenance of union principles and policies. However, there is a danger of their defeating their own purposes by the continuance of these policies.

A speaker at the Convention of the National Association of Corporation Schools stated: "If instruction in the trades is to be successful in our public schools, everything in the management of these trade schools must be subservient to the effective teaching of the boy, yet at the very beginning we have an influence pushing itself forward, which declares itself in opposition to any methods of teaching which may affect its own privileges.

"I do not know of one instance in an actually existing or proposed vocational school, supported by general taxation, where organized labor has not forced a representation upon the board of managers for the avowed purpose of seeing that their own monopolistic advantages are not jeopardized.

"Upon us manufacturers, and other business enterprises, who are conducting training schools, at our own expense, rests the responsibility of establishing vocational education on a successful basis in this country."

The speaker is one of the proprietors of a shop which operates a school for apprentices with 135 apprentices attending, and with fifty apprentices entering each year. The school is entirely under the control of the proprietors and it is needless to state that the shop is non-union and that the graduates are, and always will be, non-union men.

The American Federation of Labor has passed resolutions condemning such schools and favoring vocational education in the public schools, but nevertheless, these corporation schools are increasing at a rapid rate and are graduating non-union men who are given employment in the shops in which they were trained. Thus the ranks of the non-union men are being recruited at a much more rapid rate than the union ranks, as there are no restrictions on the number of apprentices in the non-union shop.

The present situation is, therefore, somewhat as follows: Vocational Education is coming—it is here. No organization can stop it by passing resolutions. The question is, by what avenue shall it come; thru the public school, in the administration of which the unions are represented, or thru the corporation school in which anti-union sentiments prevail?

Merely passing resolutions favoring, in general terms, vocational or industrial education does not suffice. The Unions should encourage boys to attend public vocational schools, in which the sentiment will be at least neutral, if not favorable to union policies, by allowing graduates of these schools or courses, credit on their term of apprenticeship for time spent in such schools.

CONNECTICUT VS. WISCONSIN.

"We are too often proceeding by prohibition—too rarely by the opening of genuinely wider opportunities of success. The one is akin to the methods of charity—the other to those of education. The former influences were responsible for the mistaken and repressive child labor laws in Ohio, which have driven out of the excellent continuation schools in Cincinnati more than half of their attendance, and also for the well intentioned but misguided legislation in Wisconsin that at a stroke drove a great army of children out of industry into a half-

baked system of so-called industrial training, but which left the vocational element largely to the imagination."—Howell Cheney, Member Connecticut State Board of Education, in Survey of Feb. 7th, 1914.

"Connecticut has been experimenting with the subject by expending $50,000 per year in the two cities of Bridgeport and New Britain in all-day, all-week schools at a cost to the state of about $200 per student year, taking this money from everybody's pocket thru state taxes, and devoting it to only 250 children out of the 40,000 to 60,000 whose need and whose right was equal to that of the 250."—H. E. Miles, Chairman, Wisconsin State Board of Industrial Education, in The Survey of June 21, 1913.

"The Wisconsin Schools are vocational for innumerable children gathered from the four corners, who first elect an occupation and then are taught by whatever humble processes in the first steps of that occupation and, by the hearty, earnest joint effort of employer, employee, parent and schoolmaster, are helped to places in progressive employment. . . . . So truly vocational has been the work with the operatives in a manufactory of implements of world-wide fame that the proprietors have asked for a continuation class for foremen."—Mr. Miles in The American School Board Journal, Dec., 1913.

Both Mr. Cheney and Mr. Miles are interested in Industrial Education. Mr. Cheney is one of the Board of Managers of the National Society for the Promotion of Industrial Education; Mr. Miles has just made an extended trip thru the South and West in the services of the Committee on Industrial Education of the United States Chamber of Commerce. Mr. Cheney is a manufacturer of Silk in South Manchester, Conn., and Mr. Miles until recently was engaged in the manufacture of agricultural implements in Racine, Wis.

It is unfortunate that Mr. Miles views the situation from the expense standpoint. In the article in The Survey from which the above is quoted, he states "As the State Superintendent in Pennsylvania has just said, 'to educate all the children who need it thru any such all-day, all-week schools as have been developed yet, would bankrupt any state'. Thank the Lord, that course is as unnecessary as it is wasteful and impossible." It is also unfortunate that a State Superintendent of Schools should view education as other than an investment paying the largest dividends, and an investment of that character will never bankrupt any state.

Mr. Cheney misinterprets the Ohio Law somewhat when he states that it has driven more than half of the pupils out of the excellent continuation schools of Cincinnati. The law has driven the children into those excellent schools six hours a day, five days in the week, instead of five hours a week as formerly. We cannot agree with him that the stroke which "drove a great army of children out of the industry" into a school five hours a week, was such a great calamity, even if the schools were not altogether vocational.

Mr. Miles' statement would lead one to believe that all of the children in the Wisconsin continuation schools are being helped to places in progressive employment, by the joint efforts of everyone concerned. As a matter of fact only five per cent of the children in the Wisconsin continuation classes are apprenticed to a progressive employment. The others are just employed children.

THE TEACHER OF THE INDUSTRIAL SCHOOL.

The following extract is from a letter bearing on our editorial in the February number on "Who Shall Teach in the Industrial Schools?"

"Are the knowledge of a subject and the ability to impart that knowledge *all* the essential qualifications of a teacher? Do you not forget the all important qualification of moral character?"

No, we did not forget moral character in discussing the qualifications of a teacher; we *assumed* it as the fundamental prerequisite for those who presume to teach.

Public education is justified on the grounds that it makes *better* citizens. We have grown to expect that the most enlightened community shall at the same time be the most moral community. The fact that arguments have been marshalled to combat, in a measure, this proposition does not alter the truth that this is our philosophy of education.

Industrial education hopes to aid in the preparation and the regeneration of society by safeguarding to its individual members more socialized intelligence, more efficiency, and more genuine contentment. Like any other education, if it does not finally and inevitably bring that righteousness that exalteth both a nation and an individual, it fails.

The proper kinds of occupational work in the schools give the boys and girls the ideal opportunity to participate in the real doing of worthy deeds. This idea has in it the possibilities of a tremendous factor in the building up of a fine body of habits and ideals in the realm of social life and relations. But neither the proper kind of work, nor the wise organization of the work, nor the adept handling of a subject to produce intelligence and skill can avail to counteract the unconscious influence of a morally unsound teacher.

Not long ago, a teacher was heard to remark of one of his fellow teachers, that "He is a brilliant man, a fine workman and an ideal teacher, but he's a boozer." Think of connecting "ideal teacher" and "boozer" in one sentence!

Yes, in the industrial arts we must go into the industries and get skilled people and train them to teach, but we must have the *best* in every sense. In skill and intelligence and in morals, they must be worthy the respect and emulation of our boys and girls.

WHAT IS A SKILLED OCCUPATION?

At a recent conference of school officials, called by C. A. Prosser, Secretary of the National Society for the Promotion of Industrial Education, the following was adopted as a tentative definition of a skilled occupation:

A skilled occupation is one which meets these three conditions: (1) provision of a living wage for the worker; (2) a content which offers the possibility of differences in the quality of the work turned out; (3) provision for promotion, by constituting one of a series of progressive steps in the industry leading to something better.

BOOK REVIEWS

The Industrial Training of the Boy.

By William A. McKeever. 12mo, cloth, illustrated, 72 pages, 50 cents. The Macmillan Company, New York.

This book constitutes Part One of the author's larger work, "Training the Boy," and is intended to suggest ways and means whereby parents and others may conduct their children thru an ideal course in industrial training, from early childhood thru a college course. The underlying idea presented is that successful development will come only at the expense of early care and supervision.

The author describes methods and means for training children for service and efficiency, success and happiness, and presents suggestions which every parent should read and consider. The ideas are not only theoretical but thoroly practical.

At the end of each chapter there is a complete bibliography on the subject treated in that section of the book.

Industrial Studies: Europe.

By Nellie B. Allen. 12mo, cloth, 409 pages. 80 cents. Ginn & Company, Boston.

Teachers who have used Miss Allen's "Industrial Studies: United States" will welcome this new volume of industrial studies as an invaluable aid in presenting geography and kindred subjects. It is written along the same lines as the earlier volume, and furnishes children from the fifth grade up with a knowledge of the life, particularly the industrial life of European nations.

It opens with a description of the building of the ship which takes the reader from New York to Liverpool. The occupations of the people of the different countries are described graphically and in an intensely interesting manner. The numerous illustrations add interest to the text.

Educational Metalcraft.

By P. Wylie Davidson. 246 pages. Price, $1.40, net. Longmans, Green & Co., New York, Bombay, London and Calcutta.

A clearly stated and fully illustrated description of the various processes in the execution of Repousse, Chasing, Tool-making, Pewter Modelling, Soldering, Coppersmithing, Silversmithing, Jewelery, Stone Setting, Moulding and Casting, Engraving, Inlaying, Niello, Enamelling, Repairing and Finishing.

This is one of Longmans' Technical Handicraft series and is directed to help the beginner in metalcraft.

The author of this splendid text on metalcraft is instructor in the Glasgow School of Art and in the Summer School, St. Andrews.

The book contains upward of 450 Diagrams reproduced from pen drawings and photographs. The description is so clearly stated and the cuts are so definite that the exact process of execution can be acquired from the book for the various kinds of metal work.

Architectural Drawing.

Fifty pages. Price, 25 cents. The Prang Co., New York, Chicago, Boston.

In this text, architectural drawing for a one-story cottage, a two-story dwelling, a city house and a public library are illustrated and explained. Conventions of architectural drawing are also given with notes on planning and construction. This brief text is suitable for a beginning in architectural drawing in the high school.

Foods and Household Management.

By Kinne and Cooley. 400 pages. Price, $1.50. The Macmillan Co., New York.

This volume is a companion to "Shelter and Clothing" by the same author, and is intended for high-school and normal-school classes. To quote from the preface, it "treats specifically of foods, their production, sanitation, cost, nutritive value, preparation, and serving, these topics being closely interwoven with the practical aspects of household management. They are followed by a study of the household budget and accounts, methods of buying, housewifery and laundering. It includes about 160 carefully selected and tested recipes, together with a large number of cooking exercises of a more experimental nature designed to develop initiative and resourcefulness."

This is an authoritative work, very interestingly written, fully illustrated, and well adapted to the purposes of both home and school. If it receives the wide recognition which it deserves, it will have a marked influence on the work in the Household Arts.

Pictorial Representation.

Forty pages. Price, 25 cents. The Prang Co., New York, Chicago.

The prime function of freehand drawing in the schools is the ability to conceive and express simple impressions of natural form. The method of doing this depends upon a selection of essential masses, tones, lines and colors and the ability to reject things not essential. This process of selection and rendering is well stated and illustrated in this little text. Landscape, trees, flowers, still-life, figures and buildings are shown in the simplest method of drawing suitable for school work.

Bacteriology and Diagnosis.

By Veranus A. Moore and Clifford P. Fitch. 154 pages. Price, $1.00. Ginn & Company, New York, N. Y.

This book meets the demand of students and practitioners who desire methods for the specific diagnosis of the more common infectious diseases of animals. The 46 exercises in Part I devoted to laboratory bacteriology, are so graded as to give the student a thoro understanding of technique and a definite knowledge of certain important species pathogenic for animals. As the author states, the purpose of the first twenty exercises is to teach how to do the things called for in the later exercises and in some of the practical applications of bacteriology. This method of attack is far superior to any other. The best results are obtained by teaching fundamental principles and methods as such. Time is saved and the student's efficiency is doubled by "knowing how."

This book does not take the place of a course of lectures. It is especially designed to aid the student in finding out for himself what textbooks say of certain species, and to guide him in the elementary steps in diagnostic procedures, tests, and analyses.

Part II gives specific directions for the diagnosis of infectious diseases of animals. Besides being an excellent manual for the student, this book will be found helpful to the practitioner who desires assistance in the application of his knowledge to the diagnosis of infectious diseases.

E. S. Tillman.

Farmers of Forty Centuries.

Or Permanent Agriculture in China, Korea and Japan. By F. H. King. 250 pages. Price, $2.50. Published by Mrs. F. H. King, Madison, Wisconsin.

It means much that this book was written by the author of numerous scientific works. Dr. King was formerly Professor of Agricultural Physics in the University of Wisconsin and later Chief of the Division of Soil Management of the United States Department of Agriculture. It is also significant that L. H. Bailey, the eminent authority, wrote the preface to this volume upon which Dr. King was at work at the time of his death.

This book is the result of extensive travels and intimate mingling with the Mongolian people of China, Korea and Japan. The volume combines scholarly and broad, sympathetic insight with story and description as fascinating as romance. From the efforts of these ancient people, Professor King has drawn numerous lessons bearing on permanent agriculture for all civilization. This interesting and authoritative work should be at least in every library.

Historic Ornament and Art History.

Seventy pages. Price, 25 cents. The Prang Co., New York, Chicago.

A brief survey of the historical styles of ornament and of Art History in a concise, well illustrated form, suitable for classwork in high schools.

Industrial Education.

By James E. Russell and Frederick G. Bonser. 50 pages, price 30 cents. Published by Teachers College, Columbia University, New York City.

This is a reprint of an article "The School and Industrial Life," by Dean Russell, and another entitled "Fundamental Values in Industrial Education," by Prof. Bonser. The demand for the bulletin has been so great that it has been necessary to make a second impression of it.

Elementary Electrical Testing.

Monograph No. 2, Joint Committee Series, National Education Association edition. Contributed by the Technical Staff of the Weston Electrical Instrument Company, Newark, N. J.

This booklet is issued in co-operation with the Joint Committee on Physics of the N. E. A. The monographs are intended to convey to teachers, the point of view of men of affairs as to the principles and facts worth teaching to high-school students, in each specialty.

Corn Meal as a Food and Ways of Using It.

Bulletin of United States Department of Agriculture, Washington. Free upon request.

Bulletin on Vocational Education.

Published by the National Retail Dry Goods Association, F. Colburn Pinkham, Manager, 33 West 42nd St., New York.

This bulletin of eight pages deals with the subject from the standpoint of the retail dry goods merchant. Considerable emphasis is placed upon the statement that if the state is to demand a minimum wage from the merchant and manufacturer, the employer has a right to demand a minimum of efficiency, and that the state so prepare the boy and girl that they shall be worth the minimum wage. The continuation school is recommended as the proper institution for this preparation.

SHORT ITEMS OF INTEREST

EDUCATION AND BUSINESS METHODS COUNT IN SUCCESSFUL FARMING.

FARMERS with a high-school education make nearly double the average income of those with merely a common-school education, and those who start earliest make the most profits, according to the Department of Agriculture's investigators. The Department's Office of Farm Management has been conducting a series of investigations in the corn-belt, which have brought out many details that should be of practical value to all agriculturists.

Those making the poorest incomes were 28 years of age when they started farming and were past 30 when they became owners. On the average the oldest men are making the least profits.

Many farmers with very little schooling succeed, but these same men would do better if they had the opportunity of further training. No one ever hears a farmer regret that he spent a part of his early life in school. The following table in the bulletin shows the relation of the owner's and the tenant's education to his income, on the farms investigated:

Education.	Operated by owners. (273 farms).					Operated by Tenants. (247 farms).				
	Number of farms.	Average size (acres).	Average capital.	Average labor income.	Average age.	Number of farms.	Average size (acres).	Average capital.	Average labor income.	Average age.
None at school.....	4	91	$15,039	$586	55	4	118	$1.650	$ 680	40
Common school	214	165	27,494	301	51	186	167	2.200	742	38
High school	46	206	37.725	651	46	51	190	3.203	1.268	33
College, etc.	9	240	42 781	796	53	6	294	3.351	1.721	41
Total or average....	273	178	$30.606	$408	49.8	247	172	$2.431	$ 870	37

There were only eight men, four owners and four tenants, who never had a school training. Of the owners and tenants 77 per cent attended a common or district school. About 18 per cent attended a high school, and one out of every 35 went to college or to some institution of similar grade.

On the whole the tenants had received more education than the owners, 23 per cent of them having more than a district-school education, while only 20 per cent of the owners had such training. Those men having the best training made the largest incomes, altho they were materially helped in doing this by much larger farms and greater capital.

Profitable Farming Keeps the Boy on the Farm.

Farming is a business the same as any other industry, and until our schools teach some of the fundamental principles governing profitable farming, the farm boy is likely to seek work elsewhere. Considering that the farm boys of today will be the farmers of tomorrow, too little attention is given to their training.

Many boys leave the farm because they see no future in it. Another important reason is the lack of profitable work at home. A moderate-sized farm is necessary to give employment to the farmer and his sons. The small farm does not provide work; hence, the boys must find employment elsewhere. Let them fully understand how farm profits and losses are made and there will be an incentive to remain. First make our farms profitable, and the question of keeping the boys there will solve itself.

MANUFACTURERS OF ROCHESTER, N. Y., ENDORSE TRADE EDUCATION PLAN.

FOR the last two years the Rochester Chamber of Commerce has had an Industrial and Education Committee working on the educational problems in Rochester. During the spring of 1913 this committee decided to make an investigation of a few of the industries in Rochester. As a result, a three months' survey was made by Raymond C. Keople, acting principal of the Shop School, covering three industries, woodworking, machine and metal working, and the clothing.

Since completing the survey, a part of the Committee has been meeting weekly to develop plans of co-operation between the manufacturers and the schools. A scheme was worked out, and on February 5th was presented to the Chamber of Commerce, at a meeting at which about 100 representatives of the different manufacturing establishments were present. The plan was endorsed in full with the exception of Section 3 relating to wages. Some employers felt that this wage scale was a trifle high. With this feeling existing among some of the machine employers, it was decided to eliminate section 3, and to adjust the wage scale with the individual employer whenever a boy is placed.

The plan as recommended by the Committee, by the Board of Education and by the Chamber of Commerce, is as follows with the exception of Section 3:

1. That the Shop School shall give to boys who are not less than 14 years old and who have completed at least the sixth grade, or preferably to boys who have completed

the work of the elementary schools, a general industrial or "try-out" course of such length as the school authorities may deem necessary, and shall select those who have an aptitude for and an ambition toward the trade of machinist.

2. That the Shop School shall give boys thus selected a preparatory course of approximately two years, one-half of each day being spent in shop practice and the other half in the study of shop mathematics, mechanical drawing, applied science, industrial history, civics and English.

3. That upon the satisfactory completion of this course the metal trades employers of Rochester shall employ these boys in such numbers as trade conditions and shop management shall warrant, at the following schedule of wages:

$9.00 per week for the first six months.
$10.00 per week for the second six months.
$11.00 per week for the third six months.
$12.00 per week for the fourth six months.

Note—In the event of any boys earning by piece work more than the above scale, the balance shall be held back by the employer and paid to the boy as a bonus at the completion of the two years' apprenticeship.

4. That during the two years' apprenticeship the employer shall allow each boy, during working hours, an amount of time off equivalent to one-half day each week, for continuing his studies, such time to be taken when manufacturing conditions will best permit.

5. That the first three months of employment, as provided in Articles 3 and 4, shall be considered a probationary period and the diploma of the school shall not be awarded until the satisfactory completion of this probationary period.

6. That the members of the Machine Industry shall select a committee of three of their number who shall—

(1) Inspect frequently the work of the Shop School and offer criticisms and suggestions for the improvement of the work.

(2) Suggest tests that shall measure the pupil's progress in manipulative skill and technical knowledge.

(3) Suggest tests that shall measure the qualifications of boys for graduation.

THE NORTH STAR.

"The North Star" is the name of the school paper published and printed by boys of the North Elementary Industrial School of Pittsburgh, Pa. The paper is a monthly and its purpose is stated in the "foreword" of the first issue as follows:

"Now what is this paper for anyhow? Why, just for fun—mostly. Oh, of course we want it to be serious in spots sometimes, maybe in big spots sometimes. But 'all work and no play makes Jack a dull boy,' and so this paper hopes to enliven the toil of the shops and the drill of the gymnasium and the discipline of the classroom with lots of things to think about, to talk about, and to laugh about,—nothing to cry about, unless you happen to 'pi' the type. We did make up a 'dummy' Star before the real thing was handed out for inspection, and we hope we didn't get any of the dumbness of that dummy into this sheet; but if this attempt at publishing a school paper doesn't suit you, just remember that you are criticizing a 'Star' of the Journalistic stage, and so wait until you see the second act at least.

"The North Star stands for guidance, vocational guidance, such as Mr. Burroughs hands out; it stands for 14 to 16-year old boys who haven't given the pink slip to Mr. Reisfar yet and don't intend to; it stands for books and tools and pictures and machines and noise and work and play and music and teachers and ambition and opportunity and good citizenship. It stands for anything that's all right; and it's a whole lot more than just a chance for a few of us to stick type and the rest of us to read,—for listen, The North Star is the organ of The North Elementary Industrial School, down on Duquesne Way, 'the school for boys like me;' and The Star will tell you about us once a month after this."

MANUAL TRAINING IN PROSSER, WASH.

THE MANUAL TRAINING DEPARTMENT of Prosser, Wash., offers four years of high school work in addition to an elementary course of woodwork in the grades.

The high school work was organized three years ago under the direction of Mr. E. F. Hultgrenn and includes classes in bench work, lathe work, cabinetmaking and printing. All of the courses except printing are correlated with mechanical drawing. Regular industrial methods are employed; pupils report their time daily and cost sheets are kept on every job from planning to packing. The job equipment includes a 5 h. p. motor, 32" band saw, an 8" jointer combined with a saw table and boring attachment and an 8 x 10 job press with the necessary accessories. The class in cabinetmaking has recently completed a fund for the purchase of a forge and equipments. This forge will be used at present to make articles required in the woodworking shop.

Regular forge work will be offered next year.

BOSTON SOCIETY OF ARTS AND CRAFTS.

THE seventeenth annual meeting of the Society of Arts and Crafts was held February 25th at the Twentieth Century Club hall at Boston, Mass. A preliminary of the meeting was an informal supper attended by over one hundred persons.

President H. Langford Warren presided over the business meeting and later made the annual award of the Society's bronze medals of merit to the following persons: Miss Mary C. Sears, bookbinder, Boston; Mrs. Josephine Hartwell Shaw, jeweler, Duxbury; Mr. Frank L. Koralewsky, iron worker, Boston. Forty-one of the craftsmen members were advanced to the grade of master in recognition of the excellence of their work.

A feature of the meeting was the presentation of the treasurer's report showing a total of $72,000 from sales for the past year.

The following directors were elected to serve for three years: Mr. Charles T. Carruth, Mr. I. Kirchmayer, Mr. H. P. Macomber, Miss Mary C. Sears, Mr. C. Howard Walker.

The Exhibition Committee of the society arranged for two exhibitions for the coming season: "Ecclesiastical Work," from March 13 to 28, and "Furnishings for a Summer Home," from April 24 to May 9.

ILLINOIS MANUAL ARTS ASSOCIATION.

THE ELEVENTH ANNUAL MEETING of the Illinois Manual Arts Association was held at Lewis Institute, Chicago, Friday and Saturday, February 13 and 14. Many of the members arrived early Friday or on Thursday, and spent Friday forenoon visiting the industrial arts work of various sorts at Lewis Institute, Lane Technical High School, Armour Institute, Chicago University, and the city ward schools.

A strong program had been arranged for the entire meeting. It covered the topics of Teacher Training, Methods of Teaching, Cement Construction, Design in Relation to Industrial Work, Woodworking, Machine Practice, Mechanical Drawing, etc.

The speakers included such people as Dr. William Bishop Owen, Principal Chicago Normal College; Mr. Bauersfeld, Lane Technical High School, Chicago; Mr. Wing, LaSalle; Misses Shaw and Avery and Mr. Gleason, Joliet; Mr. Leavitt, Chicago University; Mr. Bennett, Bradley Institute; Mr. Lang, Chicago Elementary Schools; Mr. Lyons, Normal; and others.

Friday evening the annual banquet was served to about one hundred and fifty guests in one of the dining halls of Lewis Institute under the direction of the Domestic Science Department. The program following the banquet was one of the best in the history of the Association. Dean Lewis welcomed us on behalf of Lewis Institute, and said some very telling things in his epigrammatic way. Two of his sentences which deserve to be remembered were as follows: "A lot of things have escaped us, as we have been too anxious to cash in on our information." "Every hand that works for an employer should be as sacred to him as his mother's."

Following President Newell's address on "Self Starters," were addresses by Miss Wells of the Lucy Flower School for Girls, Chicago, and Mr. Roberts, Director Vocational Education, Chicago. Mr. Bogan of the Lane Technical High School, Chicago, was called upon and responded with an explanation of the purposes of the new organization, the Vocational Education Association of the Middle West.

One thing which added greatly to the value and interest of the meeting was the presence of a large number of Chicago Teachers. The authorities of Chicago generously gave the Chicago teachers Friday afternoon to attend the meeting.

Danville, Illinois, was chosen as the place for the 1915 meeting, and the following officers were elected:

President, S. J. Vaughn, Head Department of Manual Arts, Northern Illinois State Normal School, DeKalb.

Vice-President, L. D. Perry, Director of Manual Arts, Joliet, Ill.

Secretary-Treasurer, Mr. C. E. Lang, Chicago.

Editor, L. W. Wahlstrom, Francis Parker School, Chicago.

DISCUSSES VOCATIONAL EDUCATION.

At the Conference of College Teachers of Education of the Middle West held Dec. 27th at Omaha, Neb., Prof. E. E. Lewis of the State University of Iowa discussed the necessity for Vocational Training and Vocational Guidance. He said in part:

"The problem of Vocational Education and Vocational Guidance is a problem that departments of education in the various institutions can no longer refuse to consider. It is a very old and a very large problem, and the wonder is that it has so long been overlooked by professional scholars of education. The public schools are affected by the movement. From every quarter comes the cry "revise," "cut-out," "add," "re-organize." School superintendents and principals are bewildered. They do not know what to do. They journey to Wisconsin, to Massachusetts, to Europe, only to find themselves even more bewildered by what they hear and see. They come back feeling that they must do something to meet the "demand" so they imitate the example they have seen hardly knowing what they do. In fact, there is nothing else for them to do. To whom can they turn for knowledge, advice, and direction if the professional scholars of education continue to turn their backs upon this problem?

"Schools of education should, wherever possible, offer a general course in Vocational Education to help these superintendents. Such a course should cover the history of Vocational Education, and the many allied problems. Short courses in Vocational Guidance should be given to help teachers and principals in their work of directing youths into more suitable and profitable employments. Is it not as much the function of a school of education to direct modern thought and tendencies as it is to interpret the past?"

MANUAL TRAINING IN INGLEWOOD.

Inglewood Union High School, Inglewood, Cal., has an enrollment of 170 pupils. The District has recently disposed of bonds to the amount of $150,000 for the erection and equipment of four buildings. Of the four buildings one will be devoted entirely to Manual Arts.

The Manual Arts building will have a ground floor space of about 20,000 square feet with a second floor over the central part. Provision will be made for wood shops, forge, foundry and machine shops in addition to dry kiln, tool and supply rooms and office on the ground floor.

At present the wood working is confined to a single 22 x 30 foot room with no machine tool equipment. A two-year course in woodwork and mechanical drawing is offered both boys and girls, the latter representing 30 per cent of the pupils in woodworking.

The household Economics equipment will include a model flat of four rooms the furnishings of which will be designed and built by the Manual Arts, Domestic Science, and Art Departments in co-operation.

W. R. Merrill, Director of Manual Training.

THE MICHIGAN INDUSTRIAL ARTS AND SCIENCE ASSOCIATION.

The Michigan Industrial Arts and Science Association met in Kalamazoo, Friday and Saturday, Feb. 20th and 21st. The members were invited to be present on Thursday in order that they might attend the Exhibit of the Michigan Retail Hardware Association which was held in the Armory.

Friday morning the members visited the Manual Training Department of the Western State Normal, the Girls' Vocational School and the Boys' Vocational School. In the afternoon they were shown thru the New Manual Training Building of the Kalamazoo High School. It is difficult to believe that not many years ago there was no manual or industrial training in Kalamazoo. One sees on every hand, in fact one may find in schools all over the state of Michigan, evidences of the efficient, untiring efforts of George S. Waite, Supervisor of Manual Training in the public schools and head of the Department of Manual Arts in the Western State Normal, of Kalamazoo.

At four o'clock the business meeting was held in the Commercial Club Auditorium. This was followed by a paper on "The Boy, the Shop, and the Teacher" by F. L. Johnson of Grand Rapids. C. L. Nash of Muskegon then presented the subject "Agriculture and Industrial Educa-

FURNITURE MADE BY GIRLS IN THE INGLEWOOD UNION HIGH SCHOOL, INGLEWOOD, CALIFORNIA.

tion." These papers were followed by "Technical Talks on Tools" by manufacturers' representatives.

Every one enjoyed the banquet. Courses were interspersed with music by students from the Manual Training Department of the State Normal. Some of the songs gave one the impression that they had been written for the occasion. Everybody "joined in the chorus" and altogether it was a lively affair.

After the banquet there were talks and speeches on the topic "Industrial Education for Michigan," by G. S. Waite of Kalamazoo, J. H. Trybom of Detroit, and W. H. Henderson of Hammond, Ind. J. R. Jenson of the Junior High School of Grand Rapids gave a demonstration of "Joints and Their Use in Manual Training Work." Mr. Jenson had an exhibit of about 150 different joints used in woodworking. The meeting closed with further "Technical Talks on Tools" by hardware men.

A feature of the program, which was somewhat of an innovation but very suggestive, was the provision for "Technical Talks on Tools" by manufacturers' representatives. The following firms sent representatives to the convention: Orr & Lockett Hardware Co., Stanley Rule and Level Co., Morse Twist Drill Co., Atkins Saw Co., Disston and Sons Saw Co., and the Fairbanks-Morse Co. These men demonstrated the use of tools made by their firms, especially the newer inventions. One man gave a talk on the installation and care of motors; another on specifications. They were glad to avail themselves of the opportunity to come before the manual-training teachers and the teachers profited by their talks.

Saturday morning the visitors went on excursions to various industries. Kalamazoo has several large stove works, the largest paper mill in the world and the largest factory for the making of fishing tackle, reels, lines, rods, etc.

Three years ago, twelve men met at the home of G. S. Waite in Kalamazoo to discuss the organization of an association of the manual training teachers of Grand Rapids, Muskegon, Battle Creek, and Kalamazoo. Out of this small organization has grown the present association which, at this meeting, had a few over 100 manual-training teachers in attendance. The membership is made up of a live bunch of boosters, whom to meet is an inspiration.

KANSAS MANUAL-ARTS TEACHERS ORGANIZE.

The manual-training teachers of Kansas met in Emporia on Feb. 13, and organized The Kansas Manual-Arts Association. H. H. Braucher, Emporia, President; T. M. Wood, Hays, Vice-President, and Joseph F. Parks, Wichita, Kans., Secretary, are the officers for the ensuing year.

It is the purpose of the organization to make uniform the work of the state. At present the members are working on the mechanical drawing for the first year of high school. They feel that all schools ought to do the same general work. It is not the purpose of the organization to outline a specific course of work, but to agree to or adopt a general course of principles that all schools should give during the freshman year in high school.

Joseph F. Parks.

INDUSTRIAL EDUCATION COMMISSION.

President Wilson has appointed the Commission on Vocational Education, created by the Smith-Lever law in February last. The commission is directed by the law to make an investigation of educational methods and to recommended to Congress a comprehensive system of vocational education consistent with the provisions of the law. The members of the Commission are Senator Hoke Smith of Georgia, chairman; Senator C. S. Page of Vermont, Representative D. M. Hughes of Georgia, Representative F. D. Foss of Ohio, C. A. Prosser, secretary of the National Society for the Promotion of Industrial Education, New York City; John A. Lapp, legislative reference librarian, Indianapolis; C. H. Winslow of the Department of Labor; Miss Florence M. Marshall, principal of the Manhattan Trade School for Girls, New York and Miss Agnes Nestor, Chicago.

The Smith-Lever law provides for co-operative agricultural extension work between the agricultural colleges of the States and the Department of Agriculture. The bill provides that the extension work shall consist of "instruction and practical demonstration in agriculture and home economics to persons not attending the agricultural college." An appropriation of $10,000 for each State is made outright and in addition $600,000 is appropriated to be used in installing the new system. For seven years an annual increase of $600,000 is provided and at the end of the eighth year the system is to be supported by an annual appropriation of $4,800,000. The aggregate appropriations are to be divided among the States on the basis of the percentage of rural population. Each State in order to enjoy the benefits of the law must appropriate a sum equal to that apportioned to it out of the appropriation.

CROP IMPROVEMENT THRU SCHOOLS.

The Crop Improvement Committee of the American Council of Grain Exchanges has begun an agitation for seed testing as a means of improving the crops of the United States. County superintendents of schools have been asked to form committees to carry on a campaign in their schools for systematically testing all of the seed corn used by the parents of pupils. The committee has issued a circular showing how seeds may easily be tested and is prepared to sell and erect corn testers at cost.

Information may be had from Mr. Bert Ball, Room L., Board of Trade, Chicago, Ill.

THE WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION.

The City of Milwaukee is making great preparations for the entertainment of the Annual Convention of the Western Drawing and Manual Training Association which will be held May 6, 7, 8, 9. The immense Auditorium with its Convention Halls and Committee Rooms has been engaged for the week. The Arena has been platted, and arrangements have been made for the erection of 89 booths, nine feet by fourteen feet, in which will be placed the exhibits. The present indications are that all of the space will be reserved some weeks previous to the convention.

The exhibits of the Association are a notable feature of its meetings. Schools and colleges in the Middle West send exhibits, not for the sake of advertising their schools, but in order to compare the work with that done in other institutions, and to receive the criticisms of teachers in other schools. These conventions are to the teachers of Drawing and Industrial Arts, what the Department of Superintendence is to the Superintendents.

Books, conventions, industrial commissions, and surveys all contribute to the cause of Industrial Education, but the real success or failure of the movement will be determined by the persons who actually meet the pupils in the classroom. The quality of the teaching, whether it is done by the experienced mechanic or the trained teacher, is the vital factor in the problem. For some time to come, the teaching of industrial subjects will be done by those persons who are now teaching what is broadly termed, industrial arts. It is essential, therefore that these teachers be informed as to the most approved methods and subject material. Superintendents would do well to see that their supervisors of drawing, household arts, and industrial subjects attend this convention.

The general topic for discussion in the meeting is "A Casting of Accounts, Educationally, of the Fine and Industrial Arts." Among the speakers are the following: Carroll G. Pearse, President Milwaukee State Normal; H. H. Seerley, President State Teachers College, Cedar Falls, Ia.; L. D. Harvey, President Stout Institute, Menomonie, Wis.; Warren E. Hicks, State Inspector of Industrial

MILWAUKEE AUDITORIUM. WHERE THE WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION WILL MEET

Education in Wisconsin; Emma Conley, State Inspector of Domestic Science in Wisconsin; E. J. Lake, Head of Department of Art, University of Illinois; Katherine E. Dopp, University of Chicago; Charles A. Bennett, Bradley Polytechnic Institute, Peoria, Ill.; Ora A. Blanchar, Girls School of Trades, Milwaukee; S. J. Vaughn, Northern Illinois State Normal School; F. D. Crawshaw, Professor of Manual Arts, University of Wisconsin; and Florence H. Fitch, Supervisor of Drawing, Indianapolis Public Schools.

Milwaukee has a number of educational institutions which will be of interest to the teacher of Industrial Arts. There are: The Milwaukee State Normal School, The Milwaukee Downer College, The Girls School of Trades, The Boys School of Trades, The Continuation School, The Milwaukee Art Society, The Layton Art Gallery, and an excellent school system in which the industrial element is strongly emphasized.

The Wisconsin School Arts and Home Economics Association has been invited and will meet with the Association this year.

No teacher of Drawing, Household Arts or Manual Arts can afford to miss this opportunity of meeting so many co-workers, or of seeing the work of other schools. The inspiration which comes from such a meeting is worth many times the expense incurred.

GENERAL NEWS NOTES

Miss Bonnie E. Snow, formerly Supervisor of Drawing in the Minneapolis Schools, and for the past ten years on the Editorial Staff of the Prang Company, has severed her connection with the Prang Company, and will hereafter devote her time to the preparation of material dealing with art work in the schools. She will open a studio in her home at Millburn, New Jersey.

To demonstrate the practical character of the Manual Training work in the public schools, the students of this department at Nesquehoning, Pa., have begun the erection of a Domestic Science Building.

Fort Smith, Ark. New courses in camp cooking for boys, hairdressing, manicuring, analytical and household chemistry for girls have been added to the high-school course.

Cleveland, O. The Domestic Science class of the Marion School has undertaken the preparation and serving of noonday lunches to the teachers who remain in the building during the noon hour. The department has facilities for cooking in a 2-story domestic art building opposite the school and is prepared to serve wholesome lunches at the small price of sixteen cents.

With the completion of a two-year test of Domestic Science classes at the Grove Street School in Pawtucket, R. I., the school committee and a few invited guests were recently entertained by the pupils at a dinner. The dinner was prepared and served by ten girls, representing the three districts served by the Domestic Science Department.

"Seattle School Bulletin" is the title of a new publication just begun by the school authorities of Seattle under the direction of Supt. Frank B. Cooper. The bulletin is issued weekly and is distributed thru the pupils to the parents and others interested in the work of the schools.

Salt Lake City, Utah. As an initial step in the direction of increased salaries for grade teachers, the school board has revised its salary schedule for manual training teachers. The change raises the maximum salary for these instructors from $1,020 to $1,200 per year. It is planned to pay increased salaries with the beginning of school in September.

The subject of domestic art has been undertaken in a new and attractive form at the Northwest Annex School, Philadelphia, Pa. The second floor of the building has been converted into a model home consisting of a combination kitchen and dining-room, living-room and bedroom. With the dismissal of the school at 3 o'clock, the girls of this building, as well as a number from the Northwest Grammar School, assemble at the model apartment.

HOUSTON, TEX. A self-supporting printing class is proposed for the public schools under the joint control of the school board and the local Typographical union.

BOSTON, MASS. An extension school has been put into operation at the English High School with a view of teaching high and grammar-school pupils the fundamentals of trades. The work is an advance over the regular Manual Training activities and is intended to reach the boys who are compelled to leave school at the end of the grammar-school period.

THE school board of Leominster, Mass., has converted an old residence into a model housekeeping apartment for the public schools.

CANTON, O. The boys of the Manual Training Department of the public schools have undertaken the making of medicine cabinets for the restrooms of the various buildings.

STOUGHTON, WIS. A millinery class has been opened at the Industrial School with an initial attendance of 22 persons.

KNOBEL, ARK. A Domestic Science class has been organized in the public schools.

GRAND HAVEN, MICH. Manual Training and Domestic Science have been introduced in the schools. The courses have been begun on a modest scale but will be gradually enlarged as necessity demands.

A CONTINUATION SCHOOL for clerks and factory employes has been undertaken by the board of education at Waterbury, Conn. Circular letters have been addressed to local businessmen explaining the purpose of the courses and asking for their co-operation. The sessions will be from eight to twelve each morning and each employe is required to attend one day each week.

ST. PAUL, MINN. As a means of determining the ability of students in the preparation and serving of an economical menu, the girls of A Eighth Grade of the Sibley School were recently given the sum of $2.40 and asked to prepare a meal for twelve people.

The menu consisted of the following: First course, cream of tomato soup and wafers; second course, beef loaf with tomato sauce, cream potatoes, celery, jelly, hot biscuits and butter; third, orange nut sherbet, cake and coffee. Total cost of the entire meal estimated at $2.308.

The individual cost of the items were: Veal loaf, $0.433; soup, $0.349; wafers, $0.05; potatoes, $0.12; biscuits, $0.123; butter, $0.13; celery, $0.15; sherbet, $0.185; salt for freezing, $0.05; ice, $0.10; cake, $0.308; coffee, $0.31.

NEW HAVEN, CONN. The school board is making arrangements for the establishment of a trade-school center for girls. It is intended as a "housekeeping center" similar to those conducted in other cities.

ELKHART, IND. Sewing has been inaugurated in the seventh and eighth grades and the high school as an alternate with cooking.

INDUSTRIAL ARTS instruction has been a part of the regular school course in Montezuma, Ia., for eleven years and during the past school year has been offered to grades below the seventh. At present there are seventeen high-school girls taking Manual Training all of whom are doing excellent work and seem to enjoy it. A senior girl who takes both Manual Training and Domestic Science was heard recently to make a remark as she was putting the finish on a pedestal which she had been working on for some time: "This part of it is more fun than making cookies."

PITTSBURGH, PA. A printing department has been opened in the School of Applied Industries of Carnegie Institute of Technology with an initial attendance of 40 students. It is the purpose of the new department to teach the modern ideas of typography, binding, photographing, stereotyping, typemaking and proof-reading. The classes began with lettering in design and space qualities.

WALKER, MINN. An Agricultural short course has been opened at the high school under the direction of the supervisors of the departments of Agriculture and Home Economics.

FORDYCE, ARK. An Agricultural department has been installed in the school for the benefit of those pupils who desire to follow Agricultural pursuits.

A Domestic Arts class has been begun at the Harlem Evening High School for Women in New York City. Instruction is given in Domestic Science, laundry work, home nursing, cooking for infants and invalids, and housekeeping.

ARRANGEMENTS have been made by the school authorities of Bay City, Mich., for the admittance of students from the local parochial schools to the Manual Training and Domestic Science classes in public schools. The new rule affects three schools of the Catholic diocese.

AT a recent luncheon in the Wanamaker Store at Philadelphia, Pa., given in honor of Mr. Meyer Bloomf ld of Boston, a campaign was begun for the establishment of a vocation bureau and a number of continuation schools for the city. It was announced at the gathering that a bill is in preparation by the Public Education Association for the maintenance of such schools in all industries. The bill is to be presented before the next legislature for action.

ALLIANCE, O. Upon the recommendation of Supt. B. F. Stanton, the school board has given permission for the preparation of a course of study involving the subjects of Manual Training and Domestic Science. The course will be inaugurated in the summer school, to be conducted during the vacation months, and will be in the form of a tryout preparatory to its adoption in the grades next year.

An Acknowledgment.

I wish to express my obligations to Miss Lois Coffey, of Teachers College, Columbia University, for the principles as expressed in the first five paragraphs of my article, which was published in the March number of the Industrial-Arts Magazine. I am also indebted to Miss Mary F. Ledyard and Miss Bertha D. Breckenfield, authors of "Primary Manual Work", for expressions that their book has inspired, and for assistance in construction work, that my teachers have received from it.

Mary E. Williams.

PERSONAL NEWS.

MR. CHELSEA S. STEWART and Miss Catherine Brown have accepted positions in the manual art department of Manual Training High School at Indianapolis, Ind.

MISS BERTHA RACHUTH has been appointed an instructor in sewing in the Trade School at Saginaw, Mich.

MR. FRED B. CARPENTER of Winthrop, Minn., has accepted the position of Agricultural instructor in the high school at Aberdeen, S. D.

MISS LUCY DICKSON, an instructor in the Manual Training High School at Indianapolis, Ind., has resigned to take a special course in Columbia University.

ROCK ISLAND, ILL. Mr. Harvey Ehlers, for four years commercial instructor in the high school at Gallipolis, O., has accepted a position in the high school. Mr. Ehlers has charge of classes in business arithmetic, shop mathematics and typewriting.